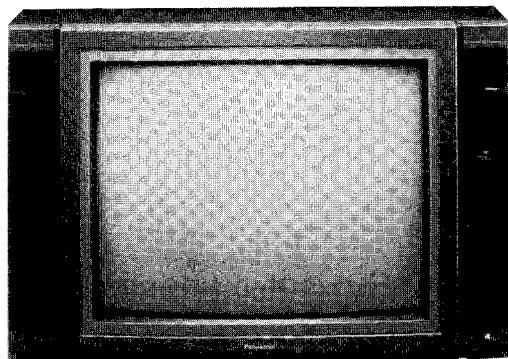


Service Manual



Colour Television

54 91004988 4
720PS

TX-2478UR/DRS
TX-2878UR/DRS

Chassis No. CX-1W

Specification (information in brackets refers to TX-2878UR/DRS)

Power Source: 220 volts, 50 Hz, AC
Power Consumption: 150 (150) Watt
Aerial Impedance: 75 Ω unbalanced coaxial type
Receiving Channels: VHF CH2-CH12 S1-3, M1-10, U1-9
UHF CH21-CH69

Intermediate Frequency: Video 38.9 MHz
Sound 33.4 MHz
Colour 34.47 MHz

Semiconductors: 55 Transistors (DRS Models 57)
77 Diodes
1 negative thermistor
1 positive thermistor
24 IC (DRS Models 25)

Picture Tube: 63 (70) cm measured diagonally
110° deflection Picture Tube

Anode Voltage: 25 kV
Speaker: Woofer 16 x 8 cm x 2
Tweeter 5 cm x 2

Sound Output: 20 Watts maximum x 2
Audio/Video in/out Terminals: 21 pin Euro connector
Audio Terminals: Headphone Jack
Dimensions: Height: 495 (548) mm
Width: 766 (826) mm
Depth: 450 (470) mm
Net Weight: 34 (39.7) kg

Technische Daten (Werte in Klammern gelten nur für TX-2878UR/DRS)

Netzspannung: 220V Wechselspannung, 50 Hz
Leistungsaufnahme: 150 (150) bei mittlerer Bildhelligkeit
Antennenanschluß: DIN-Buchse, koaxial, 75 ohm impedanz unsymmetrisch
Empfangskanäle: VHF CH2-CH12, S1-3, M1-10, U1-9
UHF CH21-C469
Zwischenfrequenzen: Bildträger, 38,9 MHz
Tonträger, 33,4 MHz
Farbhilfsträger, 34,47 MHz

Halbleiter: 55 Transistoren (DRS Models 57)
77 Dioden
1 Thermistor, NTC
1 Thermistor, PTC
24 IC (DRS Models 25)

Bildröhre: 63 (70) cm Schirmdiagonale
110° Ablenkung

Hochspannung: 25 kV
Lautsprecher: Tiefton 16 x 8 cm x 2
MT. 5 cm x 2

Tonausgangsleistung: 20 (Maximalleistung) x 2
Video-Anschlüsse: 21 poliger Euro-AV-Anschluß (Scart-Buchse)
Ausgänge (Ton): Kopfhörerbuchse, Klinke 6.3mm Ø
Abmessungen: 495 x 766 x 450 mm
(548) x (826) x (470) mm
Gewicht: 34 (39.7) kg

Panasonic

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LOCATION OF CONTROLS
DISASSEMBLY INSTRUCTIONS
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REPLACEMENT PARTS LIST

SAFETY PRECAUTIONS

GENERAL GUIDE LINES

1. It is advisable to insert an isolation transformer in the AC supply before servicing a hot chassis.
2. When servicing, observe the original lead dress, especially the lead dress in the high voltage circuits. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
3. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers, shields and isolation R-C combinations, are properly installed.
4. When the receiver is not to be used for a long period of time, unplug the power cord from the AC outlet.
5. Potential, as high as 25.0 kV, is present when this receiver is in operation. Operation of the receiver without the rear cover involves the danger of a shock hazard from the receiver power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment. Always discharge the anode of the picture tube to the receiver chassis before handling the tube.
6. After servicing make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Turn on the receiver's power switch.
3. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the receiver, such as screwheads, aerials, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between $490\text{ k}\Omega$ and $5.2\text{ M}\Omega$. When the exposed metal does not have a return path to the chassis, the reading must be ∞ .

INHALT

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SICHERHEITS-VORKEHRUNGEN

ALLGEMEINE RICHTLINIEN

1. Es ist empfehlenswert, einen Trenntransformator in die Stromversorgung zu schalten, bevor Reparaturen an einem Gerät vorgenommen werden, dessen Chassis unter Spannung steht.
2. Bei der Durchführung von Servicearbeiten dürfen die ursprünglichen Kabelanschlüsse nicht vertauscht werden, dies gilt insbesondere für die Anschlüsse im Hochspannungsteil. Hat sich ein Kurzschluß ereignet, dann sind alle Teile, an denen Spuren von Überhitzung sichtbar sind, auszuwechseln.
3. Nach Beenden der Servicearbeiten ist sicherzustellen, daß alle Sicherheitsvorrichtungen, wie Isolationsstege, Isolationspapiere, Abschirmungen und Isolations - R-C - Glieder wieder richtig eingesetzt sind.
4. Wenn der Fernseher während längerer Zeit nicht in Betrieb gesetzt wird, sollte der Netzstecker aus der Netzsteckdose gezogen werden.
5. Spannungen von bis zu 25,0 kV sind vorhanden, wenn dieser Fernseher in Betrieb ist. Die Inbetriebnahme des Fernsehers ohne aufgesetzte Rückwand bringt die Gefahr eines elektrischen Schläges von der Fernseher - Stromversorgung mit sich. Servicearbeiten sollten daher auch nie durch Personen versucht werden, die nicht in vollem Umfang mit den Sicherheitsvorkehrungen beim Umgang mit Hochspannungsgeräten vertraut sind. Vor der Handhabung mit der Bildröhre ist die Anode der Bildröhre immer an dem Empfängerchassis zu entladen.
6. Nach Beenden der Servicearbeiten sind die folgenden Kriechstrom-Prüfungen durchzuführen, um den Kunden vor der Gefahr eines elektrischen Schläges zu schützen.

MESSUNG DES ISOLATIONSWIDERSTANDES IM ABGESCHALTETEN ZUSTAND

1. Den Netzstecker aus der Netzsteckdose ziehen und die beiden Steckerstifte kurzschließen.
2. Den Geräteschalter des Fernsehgerätes einschalten.
3. Mit einem Ohmmeter den Widerstandswert zwischen dem überbrückten Netzstecker und jedem zugänglichen Metallteil am Gehäuse des Fernsehgerätes, wie Schraubenköpfen, Antennen, Achsen der Regler, Griffästungen usw. messen. Wenn ein zugängliches Metallteil eine Rückleitung zum Chassis hat, sollte die Anzeige zwischen $490\text{ k}\Omega$ und $5,2\text{ M}\Omega$ betragen. Wenn ein zugängliches Metallteil keine Rückleitung zum Chassis hat, muß die Anzeige ∞ betragen.

LEAKAGE CURRENT HOT CHECK (See Fig. 1)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a $2\text{ k}\Omega$, 10W resistor, in series with an exposed metallic part on the receiver and an earth such as water pipe.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 1.4 volts RMS. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the receiver should be repaired and rechecked before it is returned to the customer.

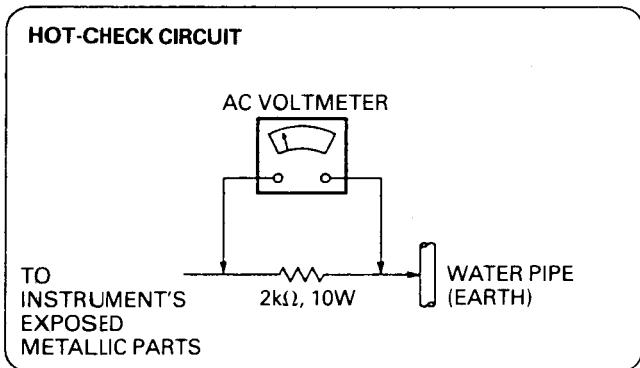


Fig. 1

X-RADIATION

WARNING:

1. The potential sources of X-Radiation in TV sets are the High Voltage section and the picture tube.
2. When using a picture tube test jig for service, ensure that jig is capable of handling 25.0 kV without causing X-Radiation.

NOTE: It is important to use an accurate periodically calibrated high voltage meter.

1. Set the brightness to minimum.
2. Set the service switch to the SERVICE position.
3. Measure the High Voltage. The meter reading should indicate $25.2\text{ kV, } \pm 1.5\text{ kV}$. If the meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.
4. To prevent an X-Radiation possibility, it is essential to use the specified tube.

MESSUNG DES KRIECHSTROMS IM EINGESCHALTETEN ZUSTAND (Siehe Abb. 1)

1. Den Netzstecker direkt in eine Netzsteckdose stecken. Für diese Messung keinen Trenntransformator verwenden.
2. Einen $2\text{k}\Omega/10\text{W}$ - Widerstand in Serie mit einem von außen zugänglichen Metallteil am Fernsehgerät und einer guten, Erdung z.B. Wasserleitung, anschließen.
3. Ein Wechselstrom-Voltmeter mit einem Meßbereich von 1000 Ohm/Volt oder größer verwenden, um die Spannung über den Widerstand zu messen.
4. Jedes zugänglich Metallteil prüfen, und an jedem Punkt die Spannung messen.
5. Den Netzstecker umgekehrt in die Steckdose stecken und jede der obigen Messungen wiederholen.
6. Die Spannung darf an keinem der Punkte 1,4V eff. überschreiten. Wird dieser Wert nicht eingehalten, besteht die Gefahr eines elektrischen Schlages, und das Fernsehgerät sollte daher repariert und nachgeprüft werden, bevor es an den Kunden zurückgegeben wird.

SCHALTUNGS AUFBAU FÜR PRÜFUNG IM EINGESCHALTETEN ZUSTAND

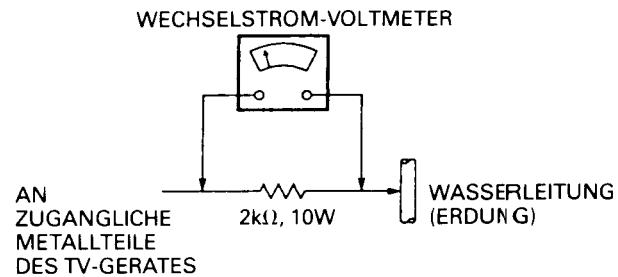


Abb. 1

RÖNTGENSTRÄHLUNG

ACHTUNG:

1. Potentielle Quellen von Roentgenstrahlung in Fernsehgeräten sind das Hochspannungsteil und die Bildröhre.
2. Bei Verwendung eines Bildröhren-Prüfgerätes für den Service ist sicherzustellen, daß es für die Belastung von 25,0 kV geeignet ist, ohne daß eine Röntgenstrahlung verursacht wird.

ANMERKUNG: Es ist wichtig, daß ein präzises, regelmäßig geprüftes Voltmeter verwendet wird.

1. Helligkeit auf Minimum stellen.
2. Den Service-Schalter in die "SERVICE"-Position stellen.
3. Die Hochspannung messen. Die Anzeige des Instrumentes sollte $25,2\text{ kV} \pm 1,5$, betragen. Falls die Anzeige diese Toleranzgrenzen überschreitet, ist sofortige die Behebung nötig, um die Möglichkeit vorzeitigen Komponentenausfalls zu verhindern.
4. Um die Möglichkeit von Röntgenstrahlung zu begrenzen, ist es wichtig, daß nur die vorgeschriebene Bildröhre verwendet wird.

LOCATION OF CONTROLS

KONTROLLANLAGE

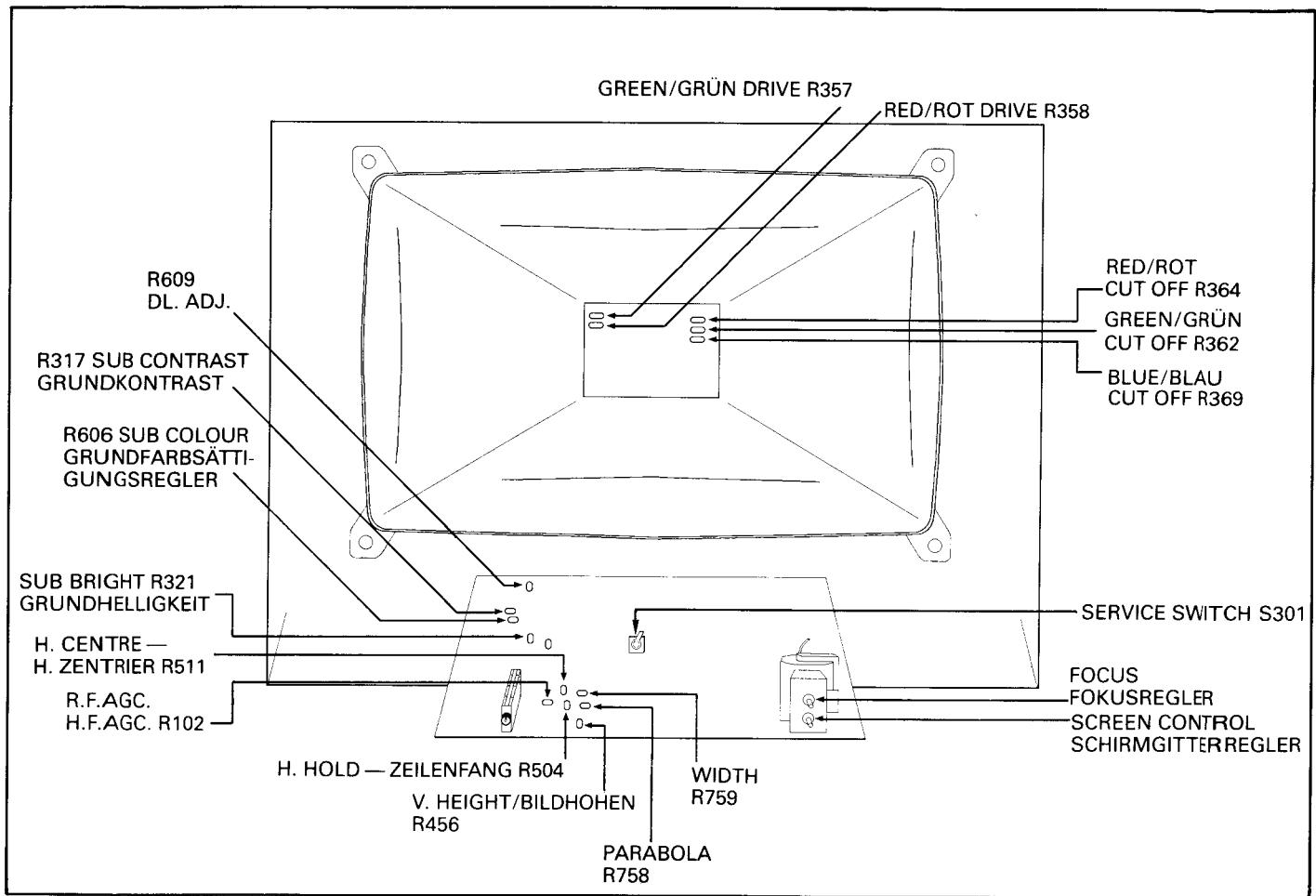


Fig. 2 Abb. 2

DISASSEMBLY INSTRUCTIONS

To remove rear cover

1. Remove 3 x Screws (A). (Fig. 3).
2. Use small flat screwdriver to push down 4 plastic clips (B), then remove rear cover.

DEMONTAGE-ANTLEITUNGEN

Entfernen der Rückwand

1. 3 Schrauben entfernen (A). (Abb. 3).
2. Mit einem flachen Schraubenzieher die 4 plastikklammern herunterdrücken.

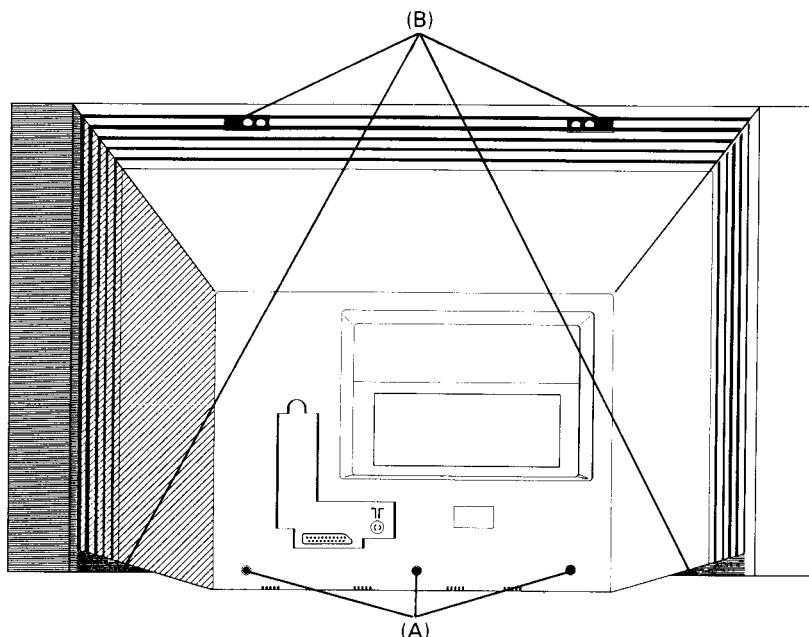


Fig. 3 Abb. 3

HOW TO MOVE CHASSIS INTO SERVICE POSITION

CHASSIS IN SERVICE-POSITION BRINGEN

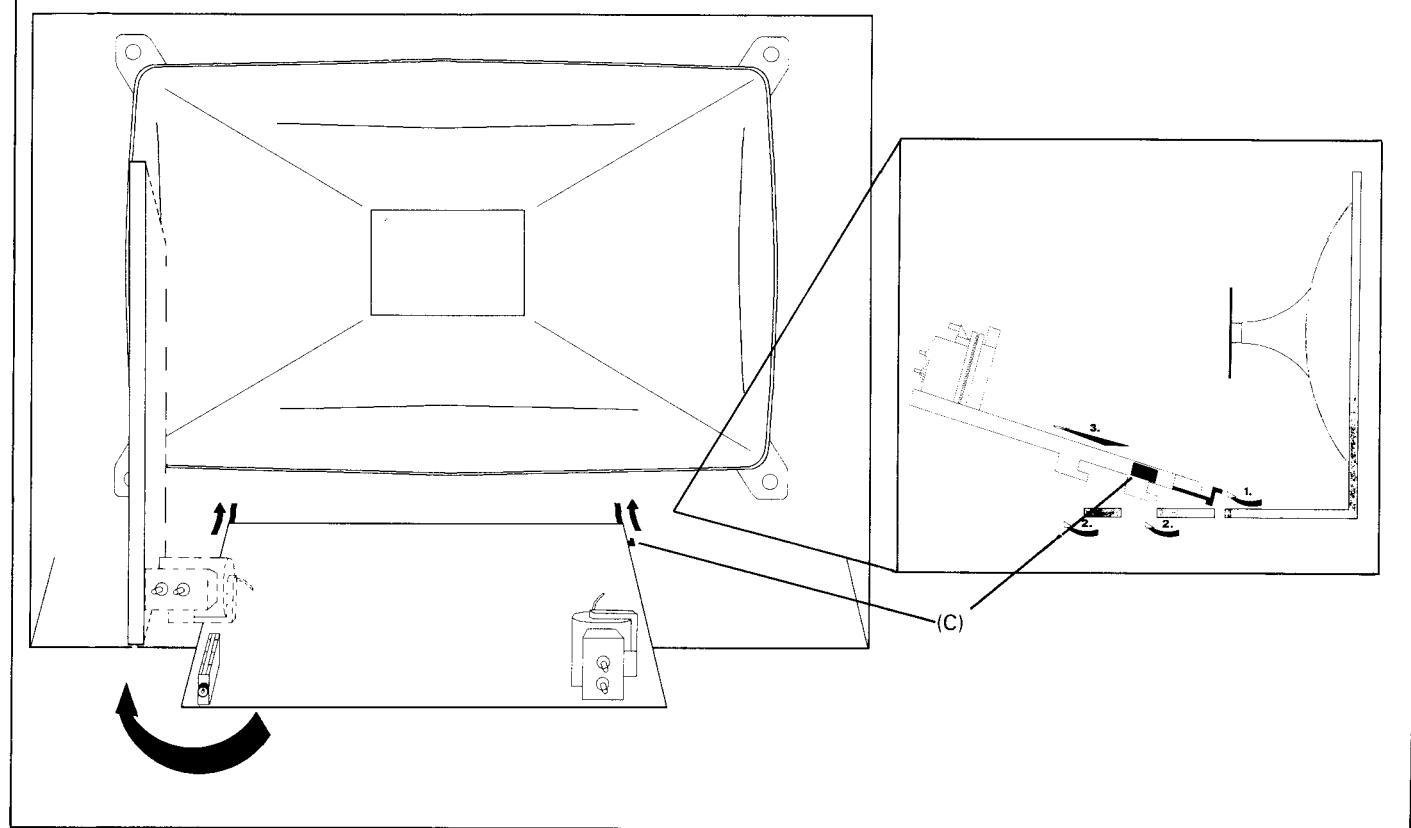


Fig. 4 Abb. 4

1. Locate tabs at far end of chassis, as indicated in Fig. 4, hold and lift tabs then pull out slightly.
2. Support chassis at front, slide out and lift up.
3. Rotate chassis clockwise to vertical position on left side of C.R.T., using service leg (C) to stand chassis in service position, see Fig. 5.

1. Die beiden Halteklemmen am Chassisende unterhalb der Bildröhre anheben und Chassis nach hinten ziehen. (Abb. 4).
2. Chassis aus den Führungen im Gehäuseboden herausheben.
3. Chassis im Uhreigern links von der Bildröhre hochkant stellen und den Halter am Cassisrahmen in die vorhandene Aussparung am Gehäuseboden einschieben. (Abb. 5).

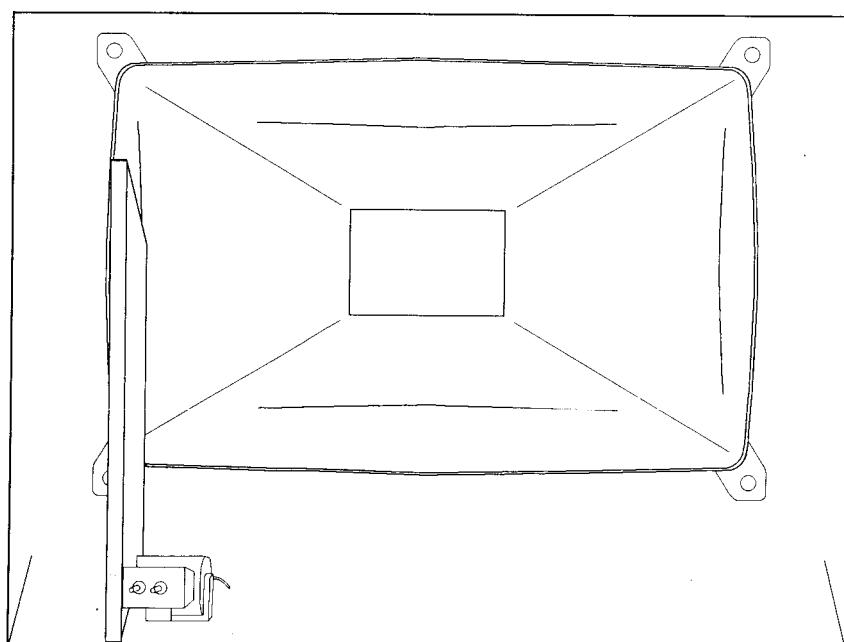
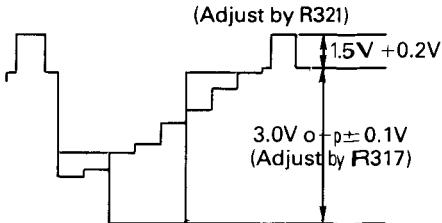
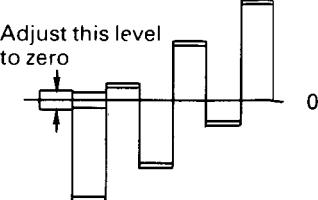
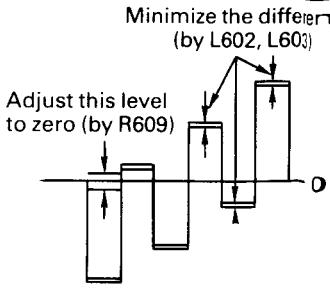


Fig. 5 Abb. 5

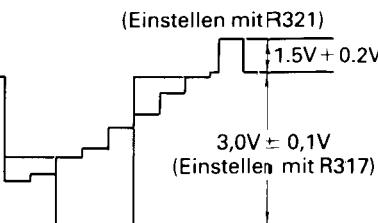
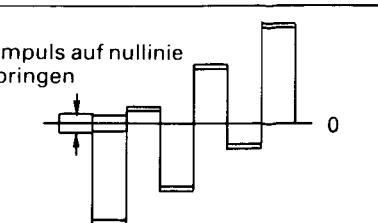
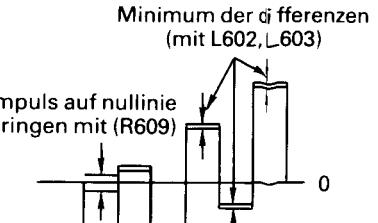
ADJUSTMENTS

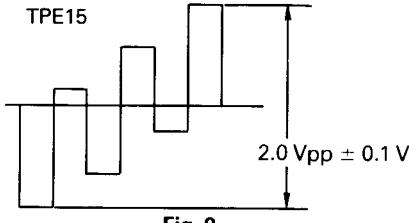
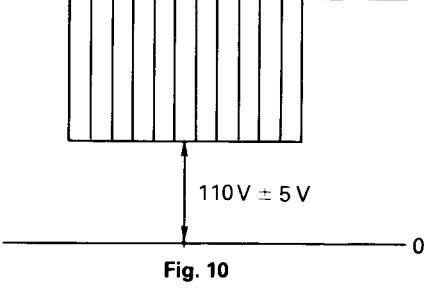
ITEM/PREPARED	ADJUSTMENT PROCEDURE
B VOLTAGE 1. Operate the TV set. 2. Set controls: Brightminimum Contrastminimum Sub-Brightminimum	1. Confirm the indicated test points for the specified voltage. TPE1: 155.0 ± 1.5 V TPE5: 12.0 ± 1.0 V TPE2: 5.0 ± 0.5 V TPE34: 25.0 ± 1.5 V TPE3: 32.0 ± 2 V TPE35: $8.5 V \pm 1.0$ V TPE4: 15.5 ± 1.0 V TPE10: $205 V \pm 10$ V
AFC 1. Operate the TV set. 2. Set a channel in UHF band. 3. Supply 38.9 MHz continuous wave to TP of Tuner. 4. Connect a DC voltmeter to TPE22.	1. Adjust L102 Voltage at TPE22 $6.0 V \pm 0.1$ V.
RF AGC 1. Receive a colour bar pattern. 2. Set the input level to $66 dB \pm 2$ dB (75Ω open). 3. Connect an oscilloscope to TPE9 with DC mode.	1. Turn RF AGC control (R102) fully clockwise. 2. Slowly turn R102 counterclockwise to set it at the point just before voltage at TPE9 drops.
HIGH VOLTAGE 1. Operate the TV set. 2. Set controls: Brightminimum Contrastminimum Sub-Brightminimum	1. Confirm that the high voltage is within a range of $25.2 kV \pm 1.5 kV$, $-1.5 kV$. Note: If the high voltage is out of tolerance, confirm that voltage at zero beam current (Bright, Contrast and Colour controls to their minimum positions) is within the above tolerance.
TELETEXT CLOCK 1. Operate the TV set and confirm the B voltage. 2. Connect a frequency counter to TPT6. 3. Earth TPT5.	1. Adjust C3528. Reading of the counter: $6.0 MHz \pm 200$ Hz.

ITEM/PREPARED	ADJUSTMENT PROCEDURE	WAVEFORM
SUB CONTRAST 1. Receive a colour bar pattern. 2. Connect an oscilloscope to TPE15. 3. Set controls: Brightminimum Contrastmaximum Colourminimum Picturecentre	1. Adjust Sub-Bright (R321) for 1.5 V. 2. Connect link between TPE7 and earth. Adjust sub-contrast (R317) for $3.0 V$ p-p. 3. Remove link from TPE7.	 <p>Fig. 6</p>
PAL APC 1. Receive a PAL colour bar pattern. 2. Connect link between TPE12 and TPE14, TPE11 and TPE5 3. Connect oscilloscope to TPE15.	1. Adjust APC trimmer (C610) to obtain stationary or slowly moving colour bars as Fig. 7. 2. Remove links and confirm colour bars are stationary	 <p>Fig. 7</p>
PAL DELAY LINE 1. Receive a PAL colour bar pattern. 2. Connect a 100Ω resistor across TPE6 and ground. 3. Connect an oscilloscope to TPE15.	1. Adjust DL Adj. (R609) and DL Matching Trans. L602, L603 to obtain waveform at TPE15 as shown in Fig. 8.	 <p>Fig. 8</p>

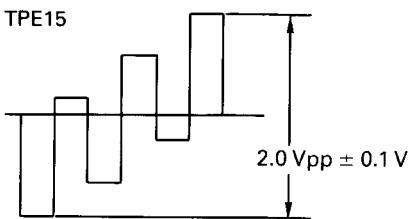
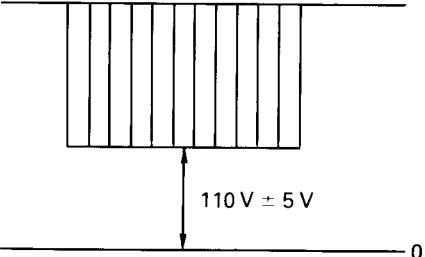
JUSTIERUNGEN

ABGLEICHPUNKTE UND VORBEREITUNG	JUSTIERUNG																	
VERSORGUNGSSPANNUNG B	<p>1. TV einschalten.</p> <p>2. Die Regler wie folgt einstellen: Helligkeitminimum Kontrastminimum Grundhelligkeitsreglerminimum</p>	<p>1. Die Messungen an den Testpunkten sollen folgende Betriebsspannungen ergeben.</p> <table> <tr><td>TPE1:</td><td>155.0 ± 1.5 V</td><td>TPE5:</td><td>12.0 ± 1.0 V</td></tr> <tr><td>TPE2:</td><td>5.0 ± 0.5 V</td><td>TPE34:</td><td>25.0 ± 1.5 V</td></tr> <tr><td>TPE3:</td><td>32.0 ± 2 V</td><td>TPE35:</td><td>$8.5 V \pm 1.0$ V</td></tr> <tr><td>TPE4:</td><td>15.5 ± 1.0 V</td><td>TPE10:</td><td>$205 V \pm 10$ V</td></tr> </table>	TPE1:	155.0 ± 1.5 V	TPE5:	12.0 ± 1.0 V	TPE2:	5.0 ± 0.5 V	TPE34:	25.0 ± 1.5 V	TPE3:	32.0 ± 2 V	TPE35:	$8.5 V \pm 1.0$ V	TPE4:	15.5 ± 1.0 V	TPE10:	$205 V \pm 10$ V
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TPE4:	15.5 ± 1.0 V	TPE10:	$205 V \pm 10$ V															
AFC	<p>1. TV einschalten.</p> <p>2. Kanal im UHF-Bereich wählen.</p> <p>3. Meßsender auf 38,9 MHz einstellen und an den Tuner-Testpunkt anschließen.</p> <p>4. DC-Voltmeter an TPE22 anschließen.</p>	<p>1. Spule L102 so abgleichen, daß die Gleichspannung am TPE22 $6.0 V \pm 0.1$ V beträgt.</p>																
RF AGC	<p>1. Empfang eines Farbbalken - Testbildes.</p> <p>2. Das Eingangssignal soll mit $66 dB \pm 2$ dB (75Ω eingespeist werden).</p> <p>3. Oszilloskop an TPE9 in DC-Funktion anklammern.</p>	<p>1. Der Regler RF AGC (R102) ist auf Rechtsanschlag zu stellen.</p> <p>2. Den Regler R102 so einstellen, daß er kurz vor dem Punkt steht, an dem der Messwert an TPE9 absinkt.</p>																
HOCHSPANNUNG	<p>1. TV einschalten.</p> <p>2. Die Regler wie folgt einstellen: Helligkeitminimum Kontrastminimum Grundhelligkeitsreglerminimum</p>	<p>1. Die Hochspannung darf bei 25.2 kV eine Toleranz von $+ 1.5$ kV und $- 1.5$ kV haben.</p> <p>Anmerkung: Falls die Hochspannung außerhalb der Toleranz liegt, bitte bei minimaler Helligkeit, Kontrast und Farbsättigung prüfen, ob sie innerhalb der Toleranz ist.</p>																
VIDEOTEXT-CLOCK-OSZILLATOR	<p>1. TV einschalten und Betriebsspannung B prüfen.</p> <p>2. Frequenzzähler an TPT6 anschließen.</p> <p>3. TPT5 auf Masse klemmen.</p>	<p>1. C3528 einstellen. Ablesung des Zählers: 6.0 MHz ± 200 Hz.</p>																

ABGLEICHPUNKTE UND VORBEREITUNG	JUSTIERUNG	SIGNALFORM
GRUNDKONTRAST	<p>1. Empfang eines Farbbalken - Testbildes.</p> <p>2. Oszilloskop an Testpunkt TPE15.</p> <p>3. Die Regler wie folgt einstellen: Helligkeitminimum Kontrastmaximum Farbsättigungminimum Bildschärfemittenstellung</p>	<p>1. Grundhelligkeit (R321) auf 1.5 V einstellen.</p> <p>2. TPE7 mit Masse verbinden. Grundhelligkeit (R317) auf 3.0 Vss einstellen.</p>  <p>Abb. 6</p>
PAL APC	<p>1. Empfang eines PAL - Farbbalken - Testbildes.</p> <p>2. TPE12 mit TPE14, und TPE11 mit TPE5 verbinden.</p> <p>3. Oszilloskop an Testpunkt TPB15.</p>	<p>1. Trimmer C610 auf minimale Bewegung in den Farbbalken abgleichen (siehe Abb. 7).</p> <p>2. Brücken entfernen und korrekte Farbbalkenfolge überprüfen.</p>  <p>Abb. 7</p>
PAL-VERZÖGERUNGSLEITUNG	<p>1. Empfang eines PAL - Farbbalken - Testbildes.</p> <p>2. 100Ω zwischen TPE6 und Masse einlöten.</p> <p>3. Oszilloskop an Testpunkt TPE15.</p>	<p>1. Einstellungen mit den Reglern DL Adj. (R609) und der Spule DL Matching Trans. (L602, L603) so vornehmen, daß die Signalform, an Testpunkt TPE15 erreicht wird, wie Abb. 8 dargestellt TPE15.</p>  <p>Abb. 8</p>

ITEM/PREPARATION	ADJUSTMENT PROCEDURE	WAVEFORM
SUB COLOUR	<ol style="list-style-type: none"> 1. Receive a PAL colour bar pattern. 2. Set controls: contrastmaximum brightminimum picturecentre sub colourcentre 3. Connect DVM to TPE21. 4. Connect an oscilloscope to TPE15. 	<p>1. Adjust colour to achieve 5.3 V at TPE21.</p> <p>2. Connect a 100Ω resistor between TPE6 and earth.</p> <p>3. Adjust sub colour (R606). For $2.0\text{Vpp} \pm 0.1\text{V}$ at TPE15 as shown in Fig. 9.</p> <p>4. Remove 100Ω resistor from TPE6 and earth.</p>  <p>Fig. 9</p>
TELETEXT CONTRAST	<p>Note: Before this adjustment is attempted. White Balance adjustment must be finished.</p> <ol style="list-style-type: none"> 1. Receive a teletext signal. 2. Connect an oscilloscope to TPE15. 3. Set controls: brightminimum contrastmaximum 	<p>1. Adjust R3514 to obtain the waveform as shown in Fig 10.</p>  <p>Fig. 10</p>

ITEM/PREPARATION	ADJUSTMENT PROCEDURE
5.5 MHz TRAP	<ol style="list-style-type: none"> 1. Recieve a signal with Multiplex sound. 2. Connect an oscilloscope to TPE15. 3. Connect 100Ω resistor between TPE6 and ground.
PILOT CARRIER	<ol style="list-style-type: none"> 1. Receive a signal with stereo sound. 2. Connect an oscilloscope to TPH5. <p>1. Adjust L104 to minimise the sound signal at TPE15.</p> <p>1. Adjust L2201 and R2209 to maximize the amplitude of sine wave on the oscilloscope.</p> <p>2. Change the stereo sound into a multiplex sound, and connection of the oscilloscope to TPH6.</p> <p>3. Adjust L2201 and R2210 to maximize the amplitude of sine wave.</p> <p>Note: Adjusted position of L2201 must be at the point where both stereo sound and multiplex sound are maximized.</p>
CHANNEL SEPARATION	<ol style="list-style-type: none"> 1. Receive a stereo signal with 40% modulation at 1KHZ for R channel, 0% modulation for L channel. 2. Connect an oscilloscope to TPH8. <p>1. Adjust R2224 to minimize signal level at TPH8.</p>

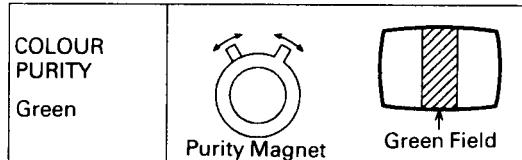
ABGLEICHPUNKTE UND VORBEREITUNG	JUSTIERUNG	SIGNALFORM
GRUNDFARBSÄTTIGUNGSS- REGLER		 <p>Abb. 9</p>
Grundeinstellung Farbsättigung (SUB CONTRAST) 1. Farbbalkentestbild empfangen. 2. kontrastmaximum helligkeitminimum konturz. (PICTURE)mitte R606 (SUB-COLOUR)mitte 3. Digitalvoltmeter an TPE21 anschliessen. 4. Oszilloskop an TPE15 anschliessen.	1. Farbsättigung an TPE21 auf 5,3 V einstellen. 2. 100Ω zwischen TPE6 und Masse einlöten. 3. An TPE15 mit R606 (SUB-COL.) 2,0Vss ± 0,1 V einstellen. 4. 100Ω zwischen TPE6 und Masse entfernen.	
VIDEOTEXT-KONTRAST		 <p>Abb. 10</p>
ABGLEICHPUNKTE UND VORBEREITUNG	JUSTIERUNG	
5,5 MHz TONFALLE		1. An TPE15 das NF-Signal mit L104 auf Minimum abgleichen.
1. Tonsignal empfangen. 2. Oszilloskop an TPE15 anschliessen. 3. 100Ω zwischen TPE6 und Masse einlöten.		
PILOT TONTRÄGER		1. Mit L2201 und R2209 die Sinusamplitude auf Maximum einstellen. 2. Oszilloskop an TPH6 anklammern und von Stereo auf Multiplex umschalten. 3. L2201 und R2210 auf Maximum der Sinusamplitude justieren. Anmerkung: Die Einstellung von L2201 muß sowohl bei Stereo wie auch Multiplex die maximale Sinusamplitude ergeben!
KANALTRENNUNG		1. R2224 so einstellen, daß das Übersprechen vom rechten zum linken Kanal (TPH8) zum Minimum wird.
1. Stereo-Signal empfangen. Rechten Kanal mit 40% 1KHZ modulieren. Linker Kanal ohne Modulation. 2. Oszilloskop an TPH8 anklammern.		

Before Colour Purity, Convergence and White Balance adjustments are attempted, V. Hold, V. Height, H. Hold, H. Centre and Focus adjustments must be completed.

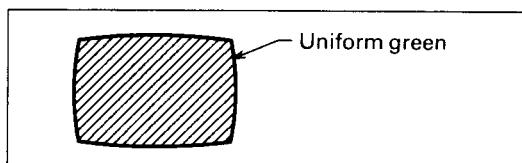
COLOUR PURITY

1. Set Bright and Contrast controls to their maximum positions.
2. Operate the TV set over 15 minutes.
3. Fully degauss the picture tube by using an external degaussing coil.
4. Apply a crosshatch pattern signal and adjust roughly the static convergence magnets.
5. Receive a black and white signal.
6. Set Low Light controls as following:

Red (R364)	minimum
Green (R362)	maximum
Blue (R369)	minimum
7. Loosen a clamp screw for the deflection yoke and move the deflection yoke as close to the purity magnet as possible.
8. Adjust the purity magnet so that a vertical green field is obtained at centre of the screen.



9. Slowly push the deflection yoke and set it where a uniform green field is obtained.



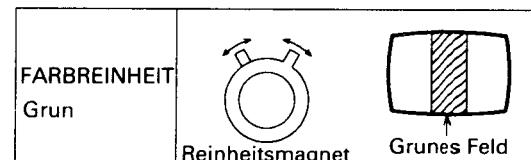
10. Adjust the Low Light controls and make sure that a uniform white field is obtained.
11. Tighten the clamp screw.

Bevor die Farbreinheit, Konvergenz und Weißabgleich, vorgenommen werden, müssen die Einstellungen, Bildhöhe, Zeilenfang, Bildbreite und Bildschärfe (Focus) durchgeführt sein.

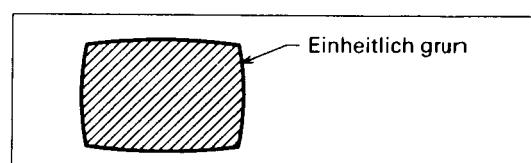
FARBREINHEIT

1. Helligkeit und Kontrast sind auf Maximum einzustellen.
2. Das TV-Gerät sollte über 15 Minuten in Betrieb sein.
3. Entmagnetisierung der Bildröhre unter Verwendung einer Entmagnetisierungsdrossel.
4. Unter Verwendung eines Gittermustersignals die statische Konvergenz einstellen.
5. Schwarz-Weiß Signal empfangen.
6. Die Einstellung der Regler:

Rot (R364)	Minimum
Grün (R362)	Maximum
Blau (R369)	Minimum
7. Lösen der Klemmschraube an Befestigungsring der Ablenkeinheit und durch Verschieben der Ablenkeinheit so dicht wie möglich an den Reinheitsmagneten.
8. Den Reinheitsmagneten so einstellen, daß ein vertikales grünes Feld in der Mitte des Bildschirmes entsteht.



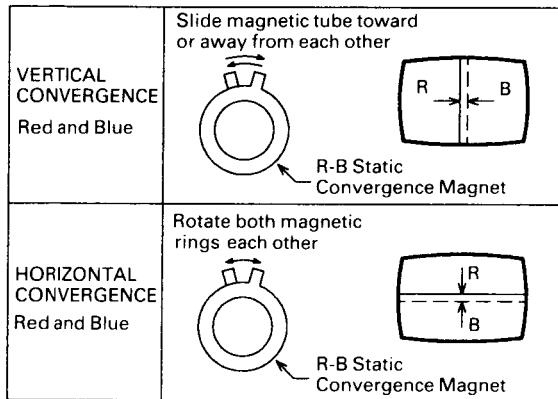
9. Die Ablenkeinheit langsam in Richtung Bildschirm schieben, so daß eine gleichmäßige grüne Fläche des Bildschirmes entsteht.



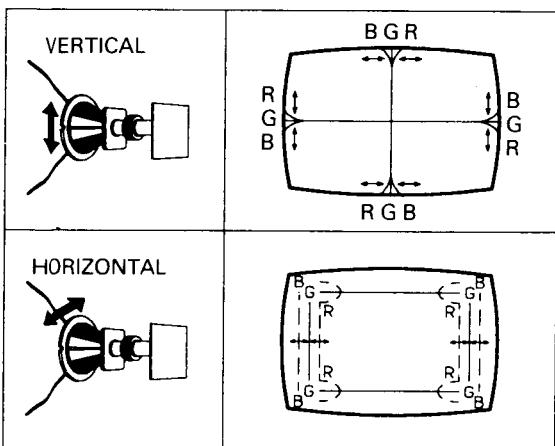
10. Die R/B-Regler aufdrehen und sich vergewissern, daß bei geeigneter Justierung eine weiße Schirmfläche zu erreichen ist.
11. Ablenkeinheit mittels Klemmschraube fixieren.

CONVERGENCE

1. Apply a crosshatch pattern signal and set Contrast control to the maximum position.
2. Adjust Bright control to obtain a clear pattern.
3. Adjust Red and Blue line at centre of the screen by rotating R-B static convergence magnet.



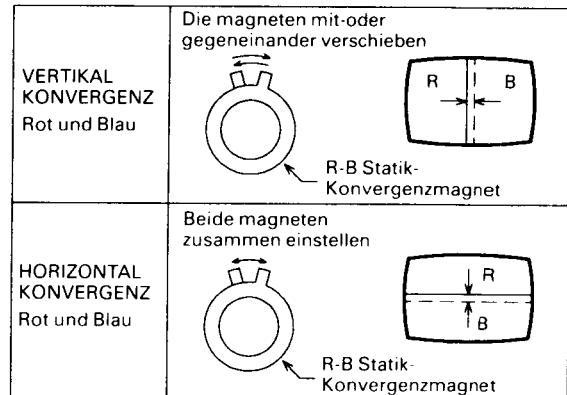
4. Adjust Red and Blue with Green line at centre of the screen by rotating (RB)-G static convergence magnet.
5. Lock convergence magnet with silicone sealer.
6. Remove the DY wedges and slightly tilt the deflection yoke vertically and horizontally to obtain the good overall convergence.



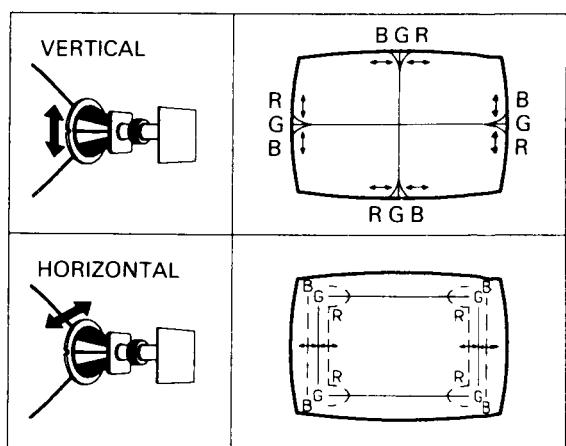
7. Fix the deflection yoke by reinserting the DY wedges. (See Fig. 12).
8. If purity error is found, repeat "Colour Purity" adjustment.

KONVERGENZ

1. Gittermustersignal einspeisen und Kontrastregler auf Maximum stellen.
2. Helligkeit so einstellen, daß ein klares Gittermuster entsteht.
3. In der Mitte des Bildschirmes die roten und blauen Linien durch Verdrehen der Konvergenz Magneten (statisch), zur Deckung bringen.



4. In der Mitte des Bildschirmes die roten und blauen Linien durch Verschieben schon fixierten RB-Magneten und dem G-Konvergenzmagneten mit den grünen Linien in Deckung bringen.
5. Nach der Einstellung die Konvergenzmagneten mit Siliconkleber fixieren.
6. Die Abstandskeile für die Ablenkeinheit entfernen und die Ablenkeinheit so ausrichten, daß die Konvergenz über die ganze Schirmfläche optimale eingestellt ist.



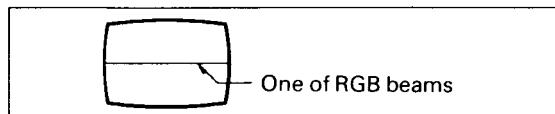
7. Die Abstandskeile sind jetzt wieder einzusetzen, damit die erreichte optimale Einstellung erhalten bleibt. (Siehe Abb. 12).
8. Ist die Farbreinheit fehlerhaft, ist der Vorgang Farbreinheits-Einstellung zu wiederholen.

WHITE BALANCE

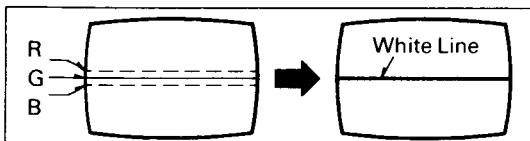
1. Receive a black and white signal and operate the set more than 15 minutes.
2. Set controls as following:

Screen (on FBT)	minimum
R-Drive (R358)	centre
G-Drive (R357)	centre

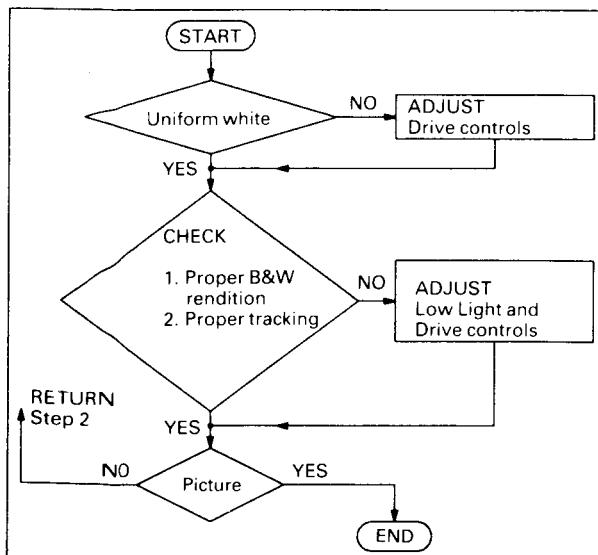
 R-Low Light (R364), G-Low Light (R362) and B-Low Light (R369) controls turn 45° clockwise from their fully counter clockwise positions on the foil side.
3. Set the service switch to the SERVICE position.
4. Connect an oscilloscope to TPY2 with DC mode.
5. Adjust Bright control so that DC voltage on the oscilloscope becomes 150 V.
6. Slowly turn the screen control clockwise to the point where one of R, G, B beams just appears on the picture tube.



7. Leave the low light control of the colour which appeared at the step 6 as it is, and turn the remaining low light controls clockwise, from the setting position at the step 2, so as to get a white horizontal line on the picture tube.



8. Reset the service switch to the NORMAL position.
9. Confirm the white balance according to the following flow chart.

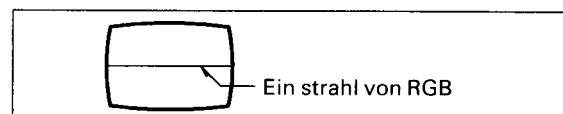


WEISSABGLEICH

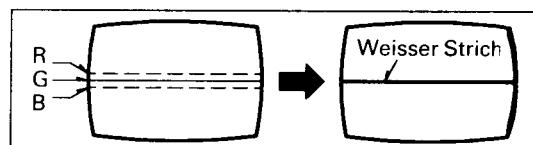
1. Schwarz/Weiß-Testbild empfangen und das Gerät mindestens 15 Minuten vor Abgleich in Betrieb nehmen.
2. Die Regler wie folgt einstellen:

Schirmgitter	Minimum
R-Drive (R358)	Mittenstellung
G-Drive (R357)	Mittenstellung

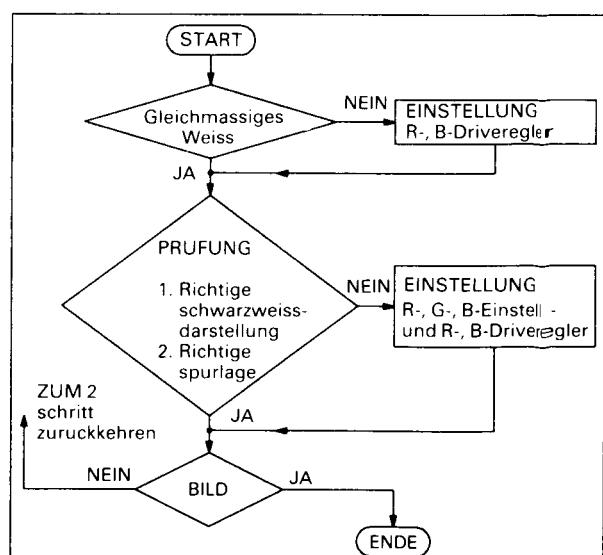
 Drehen Sie die Regler R364 (R-Low-Light), R362 (G-Low-Light) und R369 (B-Low-Light) vom linksanschlag aus 45grad im uhrzeigersinn.
3. Serviceschalterinstellung service bringen.
4. Oszilloskop an TPY2 anschliessen.
5. Helligkeit auf 150 V (DC) einstellen.
6. Den Schirmgitterregler langsam aufdrehen, so daß auf dem Bildschirm gerade ein schwach heller, horizontaler Strich von einer RGB-Farbe erkennbar wird.



7. Die in Punkt 6 erreichte Einstellung belassen und die übrigen beiden Einstellregler (R364, R362, R369) nacheinander langsam aufdrehen, bis ein weißer horizontaler Strich auf dem Bildschirm sichtbar wird.



8. Den Serviceschalter wieder in Normalposition bringen.
9. Sicherstellung des Weißabgleiches nach folgendem Ablaufplan.



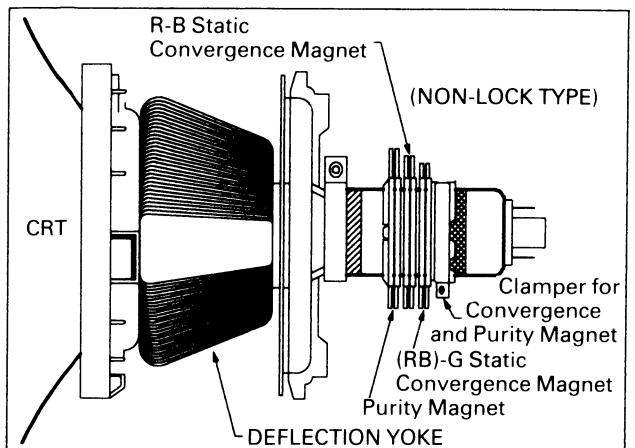


Fig. 11

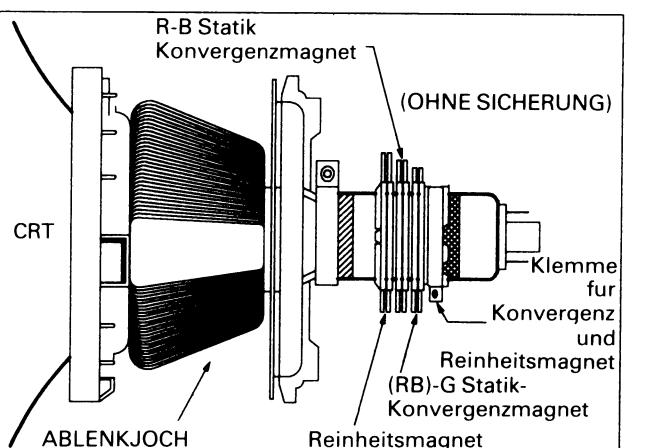


Abb. 11

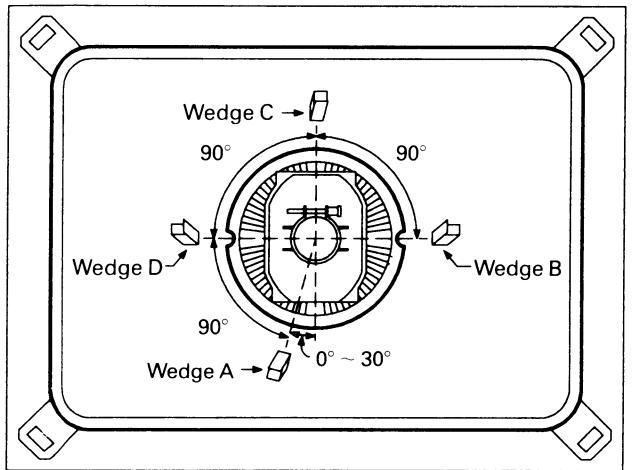


Fig. 12

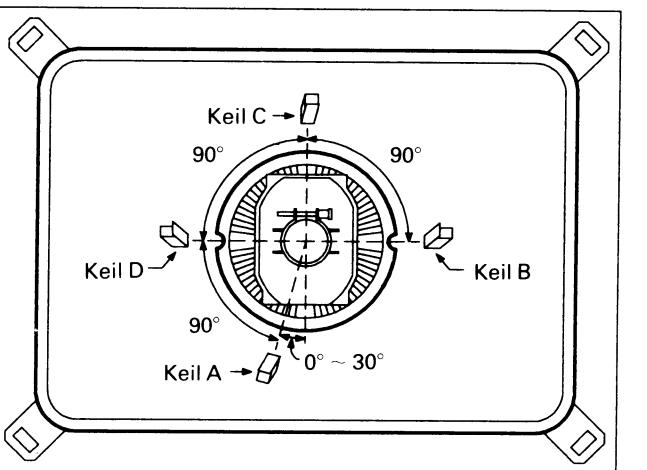


Abb. 12

Notes:

1. Wedge A shown in Fig. 12 should be fixed within a range of $0^\circ \sim 30^\circ$ to the left of the vertical line as shown.
2. After inserting wedge A, insert wedges B, C and D. The wedges should be set 90° apart from each other.
3. Be certain that the four wedges are firmly fixed and the Deflection Yoke is tightly clamped in place. Otherwise the Deflection Yoke may shift its position and cause a loss of convergence and purity.

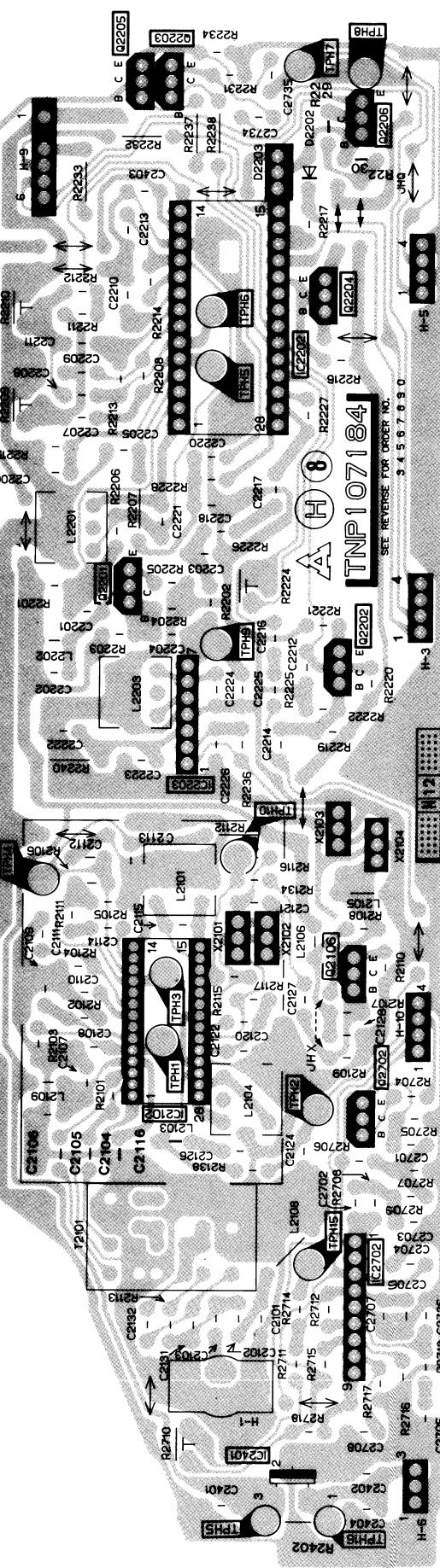
Anmerkung:

1. Der Abstandskeil A ist einer Position von $\sim 30^\circ$ zur linken der vertikal laufenden Linie zu fixieren wie es in der Abbildung 12 gezeigt ist.
2. Nach Festsetzen von Abstandskeil A sind die Keile B, C und D entsprechend der Abbildung jeweils 90° nacheinander einzusetzen.
3. Die Ablenkeinheit muß mit den vier Abstandskeilen fest und sicher in der eingestellten Position befestigt sein. Andererseits muß die Ablenkeinheit verschiebbar sein, denn eine Fehlposition ist die Ursache für Mängel an Farbreinheit und Konvergenz.

**CONDUCTOR VIEW
H-BOARD TNP107184**

I.C.	IC2401	IC2702	IC2202	
TRANSISTOR		Q2702	Q2204	Q2206
		Q2106	Q2205	Q2203
DIODE			D2203	D2202
TEST POINT	TPH5 TPH16	TPH1 TPH2	TPH4 TPH3	TPH5 TPH6
				TPH7 TPH8

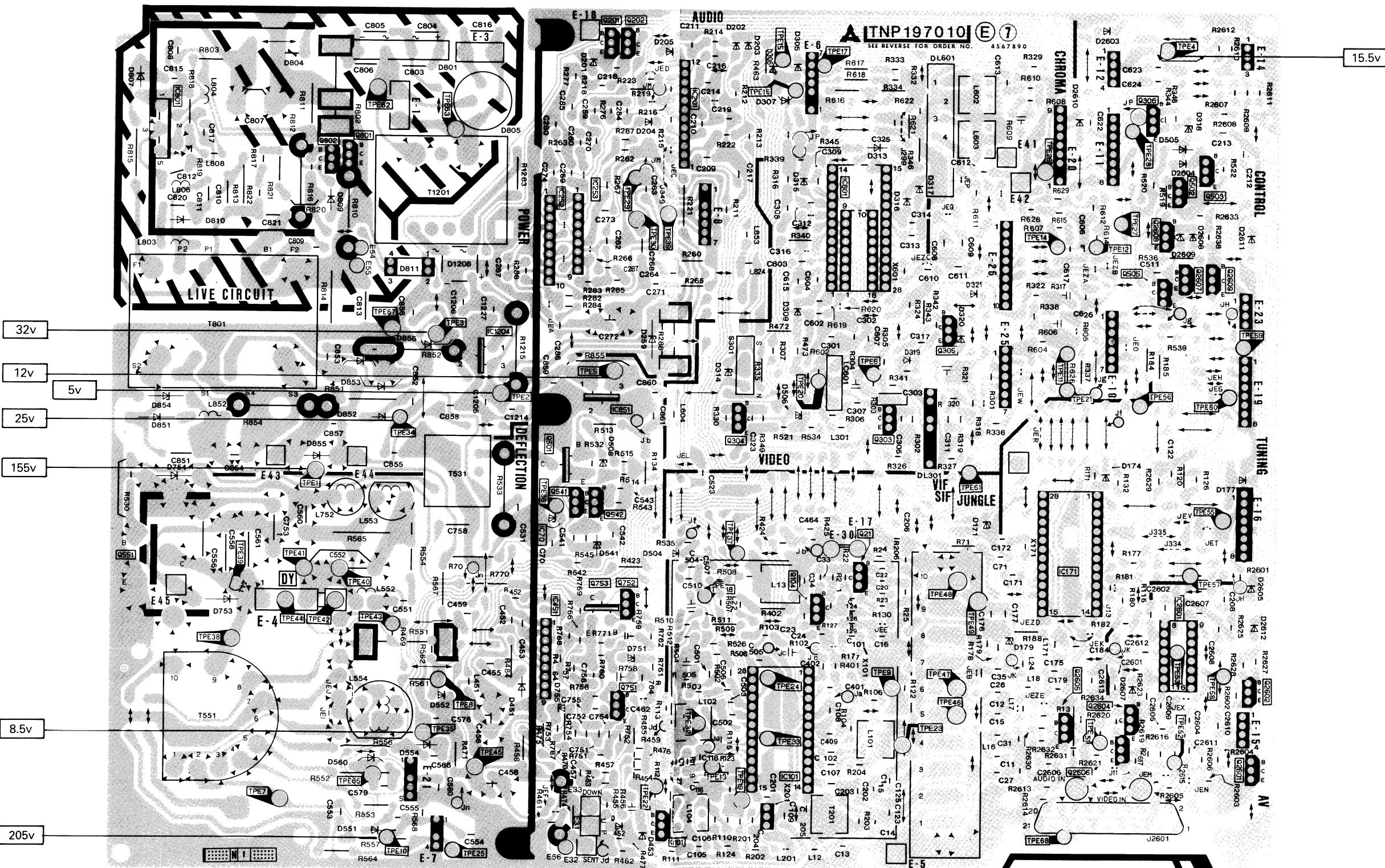
**ANSICHT DER LEITERBAHNEN
PLATINE H TNP107184**



E-BOARD TNP197010

PLATINE E TNP197010

I.C. IC801	IC252	IC201	IC601	IC171
TRANSISTOR	Q802 Q801	Q201 Q202	IC101	IC2601
Q551	Q541 Q752	Q304	Q303 Q305	Q306 Q502 Q503
Q753	Q751	Q101	Q21	Q2608 Q2604 Q505 Q2607 Q2609 Q2602 Q2601
DIODE	D810 D809 D801 D805 D201 D205 D202 D203 D306 D305 D313 D317 D316 D319 D315 D309 D506 D319 D317 D171 D179 D2610 D2611 D2609 D2605 D177 D2612	D201 D259 D508 D755 D751 D259 D452 D453 D307 D306 D313 D317 D316 D319 D315 D309 D506 D319 D317 D171 D179 D2610 D318 D505 D2604 D2609 D2608 D2605 D177 D2612	D318 D505 D2604 D2609 D2608 D2605 D177 D2612	
Test Point	TPE1 TPE34 TPE3 TPE3 TPE10 TPE35	TPE2 TPE5 TPE15 TPE24 TPE6	TPE4	



**SCHEMATIC DIAGRAM FOR MODEL TX-2878UR/DRS / TX-2478UR/DRS
(Alpha-1W Chassis)**

**ZEICHENERKLÄRUNG FÜR MODELL TX-2878UR/DRS / TX-2478UR/DRS
(Alpha-1W Chassis)**

Important Safety Notice

Components identified by  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Wichtiger Sicherheitshinweis

Teile, die mit einem Hinweis  gekennzeichnet sind, sind wichtig für die Sicherheit. Sollte ein Auswechseln erforderlich sein, sind unbedingt Originalteile einzusetzen.

NOTES:

1. RESISTOR

All Resistors are carbon 1/4W resistor, unless marked as follows:

Unit of resistance is OHM (Ω) ($K = 1,000, M = 1,000,000$).

 : Nonflammable  : Metal Oxide
 : Solid  : Metal Film
 : Wire Wound  : Fuse

2. CAPACITOR

All capacitors are ceramic 50V capacitor, unless marked as follows:

Unit of capacitance is μF , unless otherwise noted.

 : Temperature Compensation  : Electrolytic
 : Polyester  : Bipolar
 : Metalized Polyester  : Dipped Tantalum
 : Polypropylene

3. COIL

Unit of inductance is μH , unless otherwise noted.

4. Marked "L" on the schematic diagram shows lead-less parts.

5. TEST POINT

 : Test Point position.

6. VOLTAGE MEASUREMENT

Voltage is measured by a DC voltmeter.

Conditions of the measurement are the following:

Power Source 220 V AC, 50Hz

Receiving Signal Colour Bar signal (RF)

All the other customer's controls maximum

7. This schematic diagram is the latest at the time of printing and subject to change without notice.

ANMERKUNG:

1. WIDERSTÄNDE

Alle 1/4 Watt Widerstände sind Kohlewiderstände, Abweichungen sind wie folgt gekennzeichnet:

Die Maßeinheit ist OHM (Ω) ($K = 1,000, M = 1,000,000$).

 : nicht brennbar  : Metall Oxyd
 : Lastwiderstand  : Metall Film
 : Draht  : Sicherung

2. KONDENSATOREN

Alle Kondensatoren sind Keramikausführungen. Spannungsfestigkeit 50V, Abweichungen sind wie folgt gekennzeichnet.

Die Maßeinheit ist μF , wenn keine anderen Bezeichnungen genannt sind.

 : Temperatur Kompensation  : Elektrolyt
 : Polyester  : Bipolar
 : Metallisches Polyester  : Tantal
 : Z-Typ

3. SPULEN

Die Maßeinheit ist μH , Abweichungen sind gekennzeichnet.

4. Mit "L" gekennzeichnete Teile sind ohne Anschlußdrähte.

5. TESTPUNKTE

 : Kennzeichnung der Testpunktposition.

6. SPANNUNGSMESSUNG

Spannungsmessungen sind mit einem DC-Voltmeter durchzuführen.

Die Meßbedingungen sind folgende:

Netzspannung 220 V / 50Hz

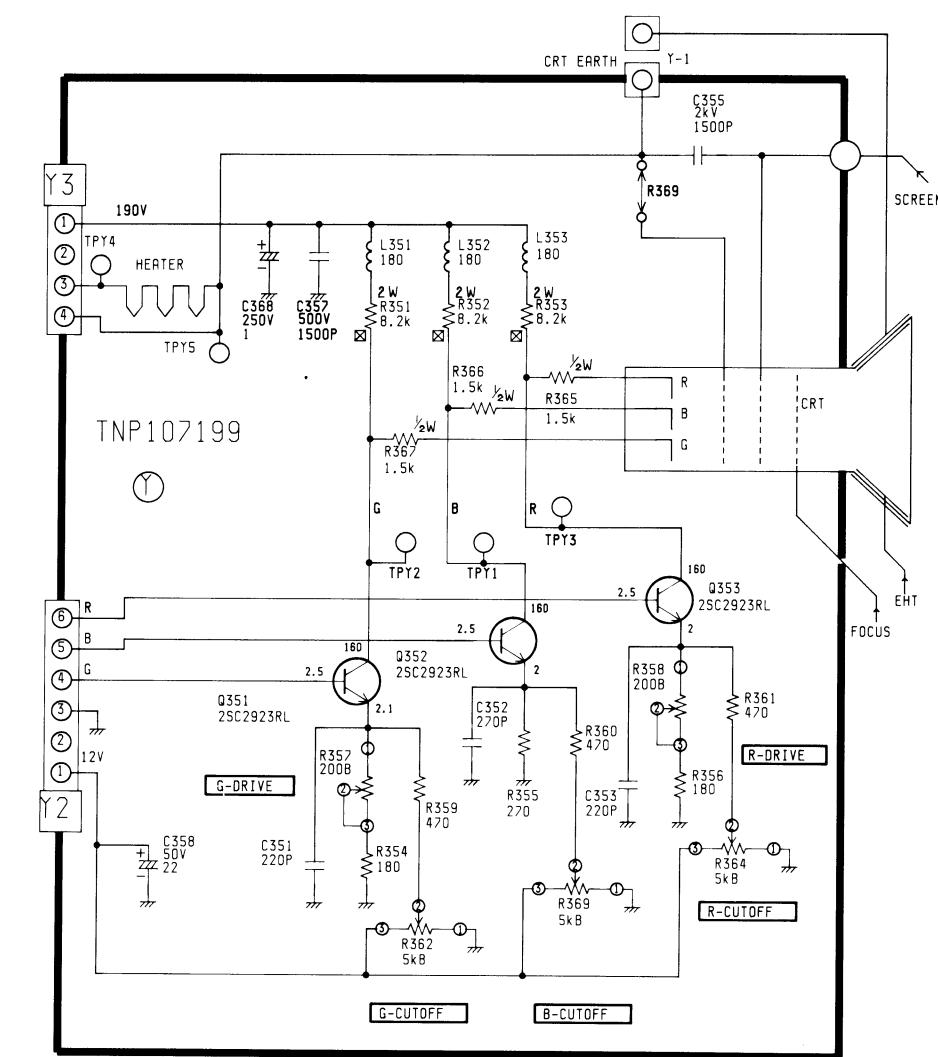
Wiedergabe Signal Farbbalken-Testbild

Alle übrigen Einstellungen

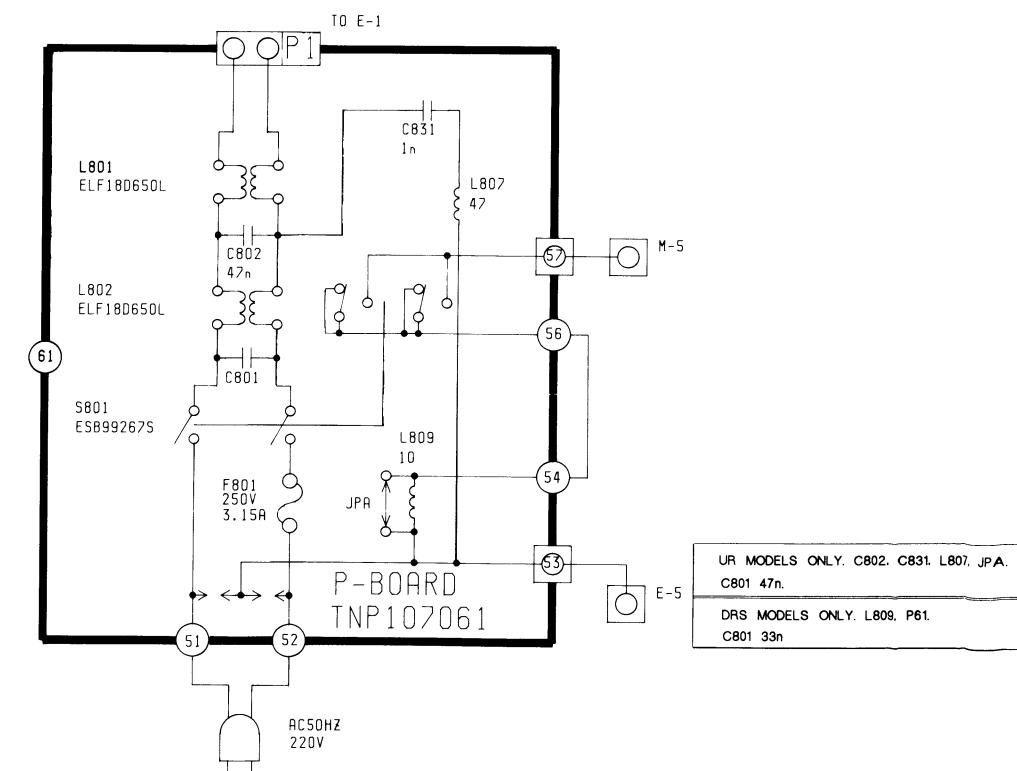
für Benutzer Sollangaben

7. Anderungen im Laufe der Fertigung sind möglich.

Y SCHEMATIC SCHALTBILD Y



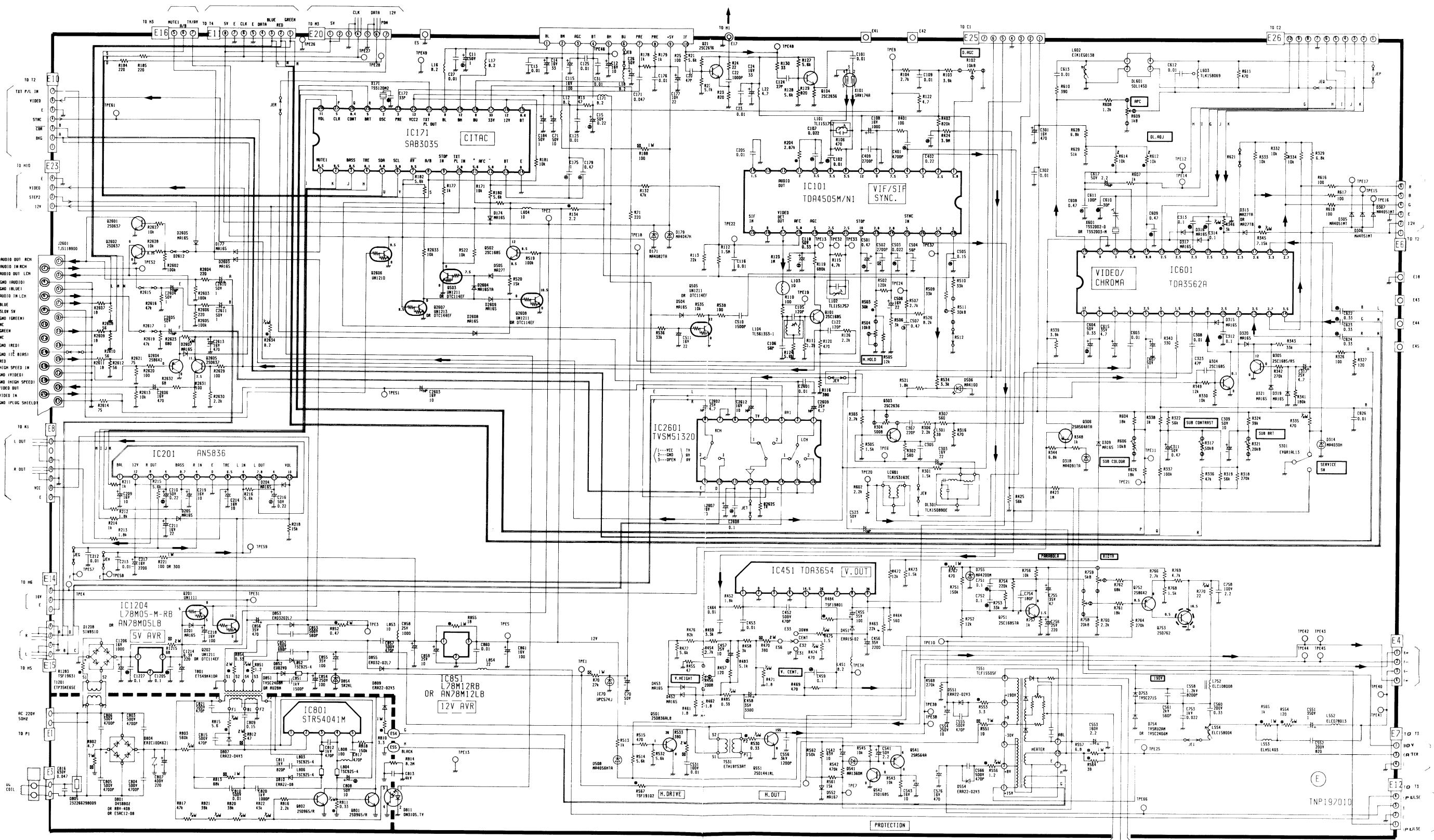
P SCHEMATIC SCHALTBILD P



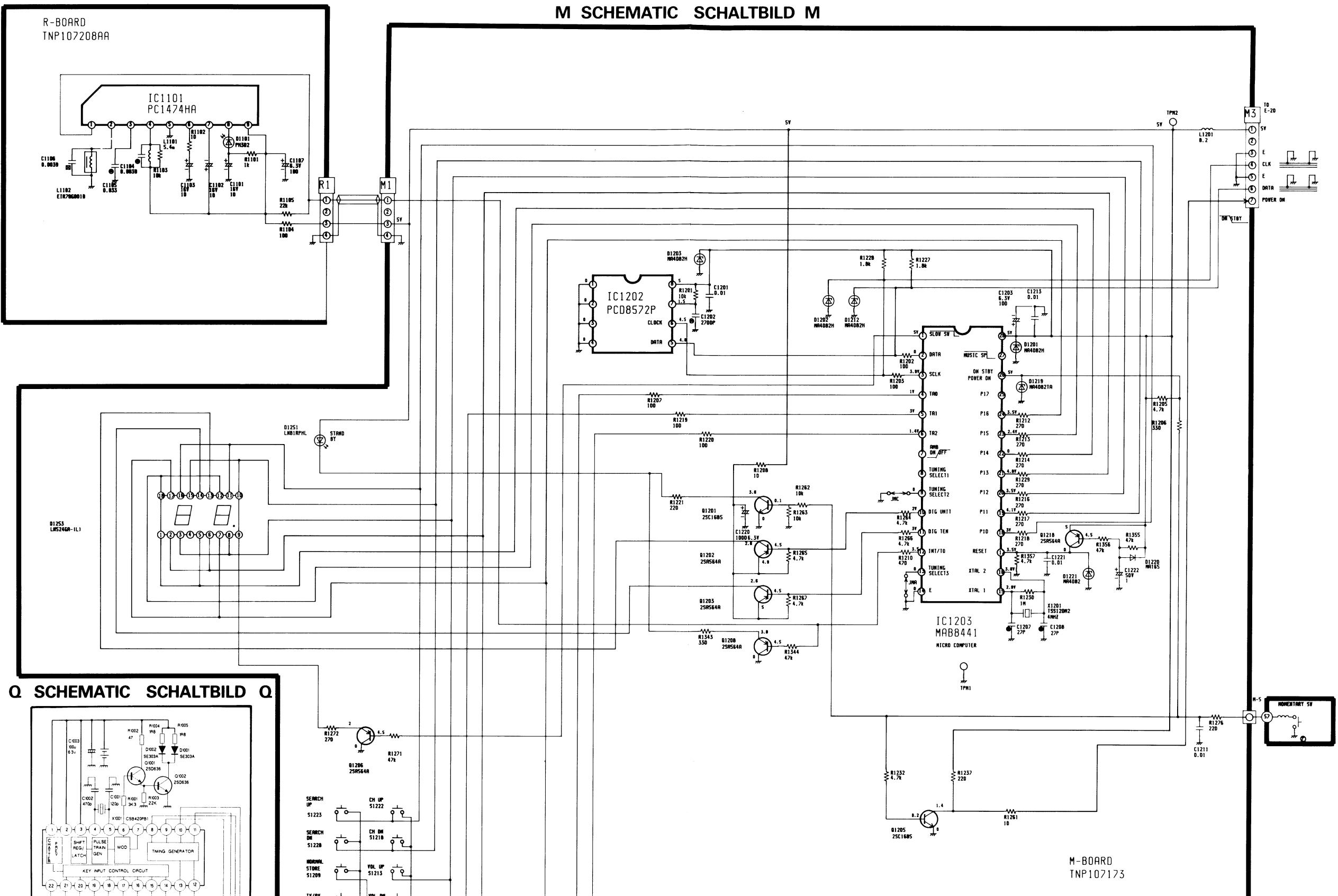
E SCHEMATIC SCHALTBILD E

UR MODELS ONLY. C813 2n2. C305 390p.
C612. R301. JEP. JEQ. JEW.

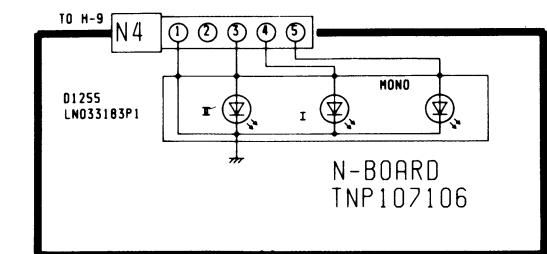
DRS MODELS ONLY. C813 3n3. C305 560p
E25. E26. E41. E42.



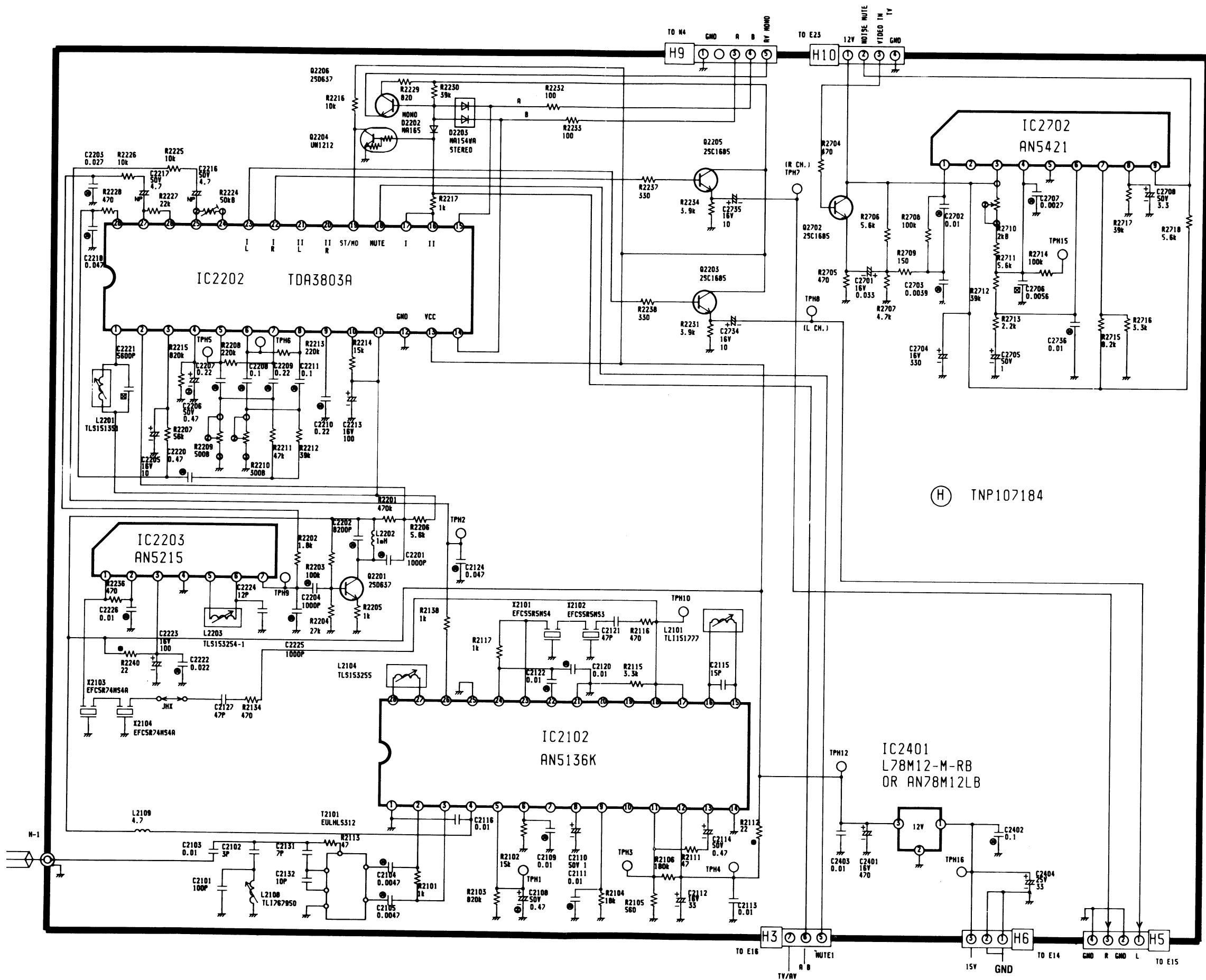
M SCHEMATIC SCHALTBILD M



N SCHEMATIC SCHALTBILD N

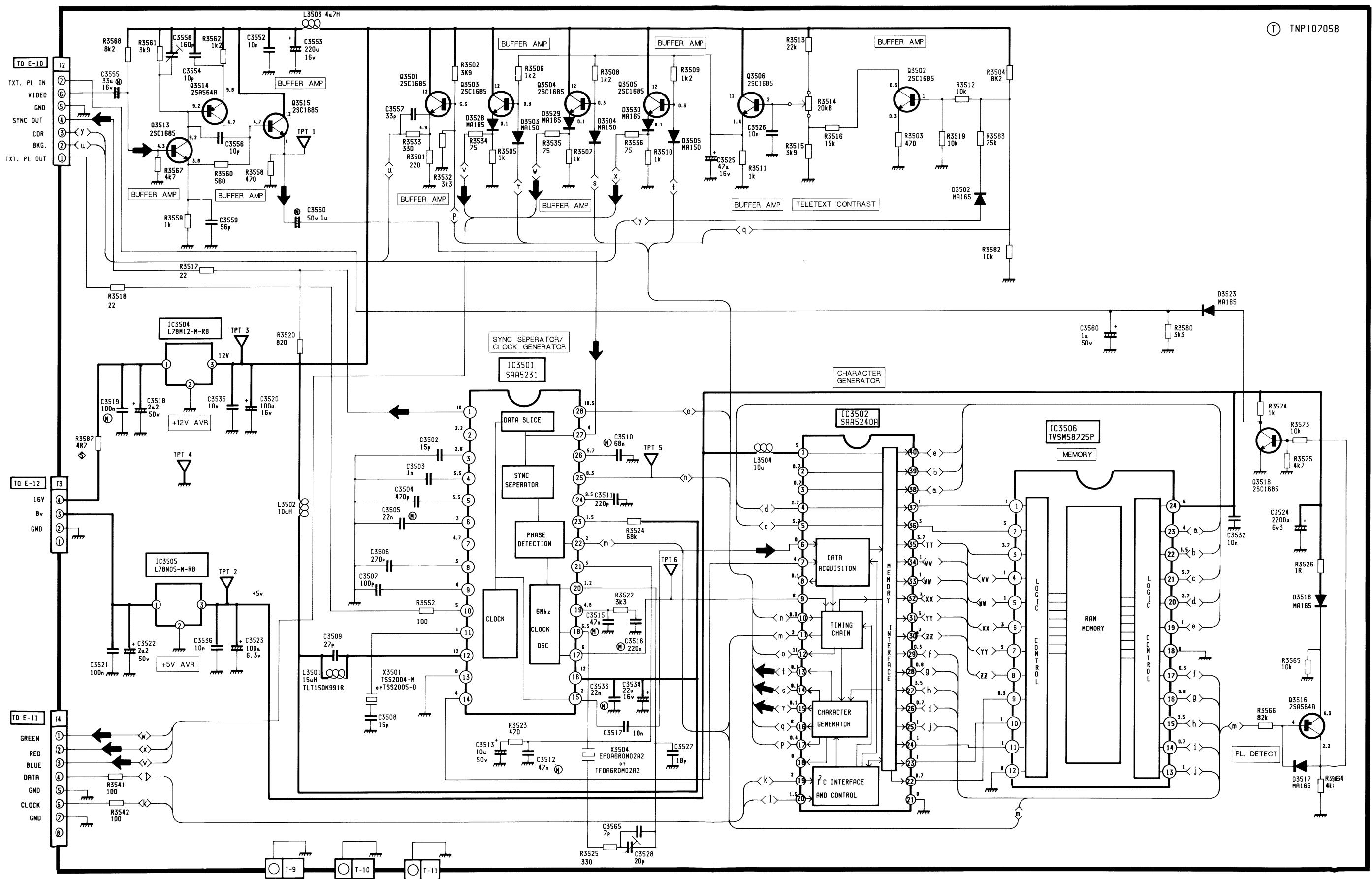


H SCHEMATIC SCHALTBILD H

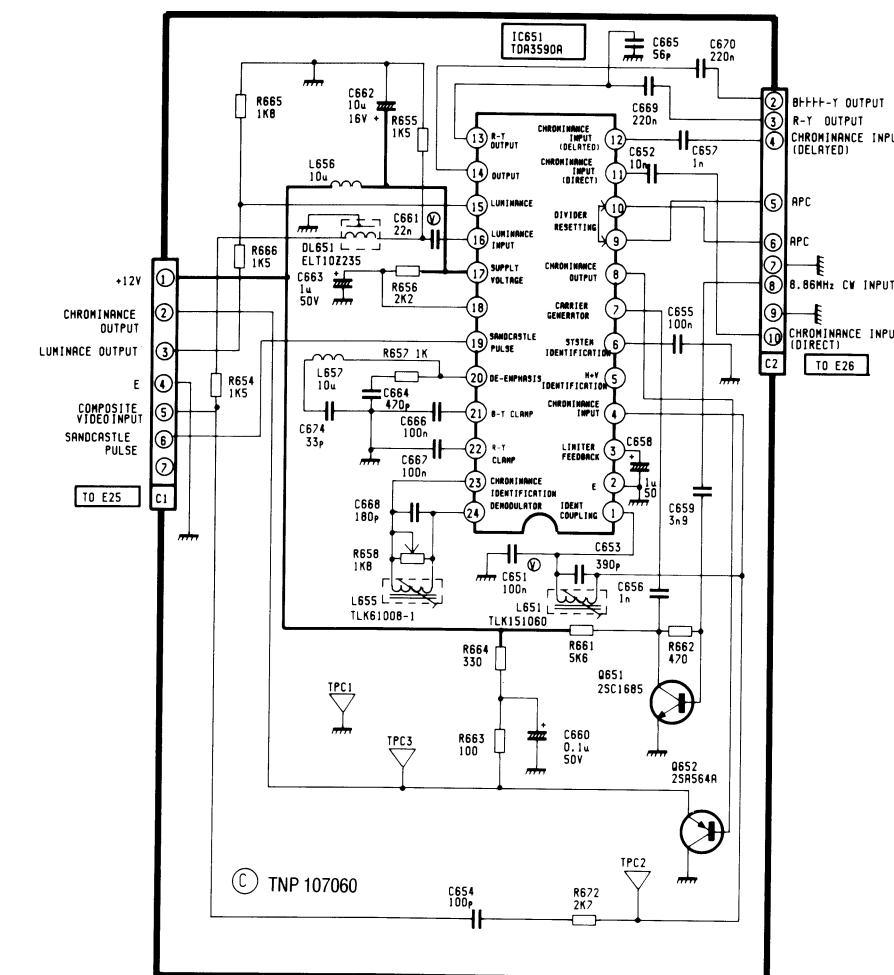


T SCHEMATIC

SCHALTBILD 7



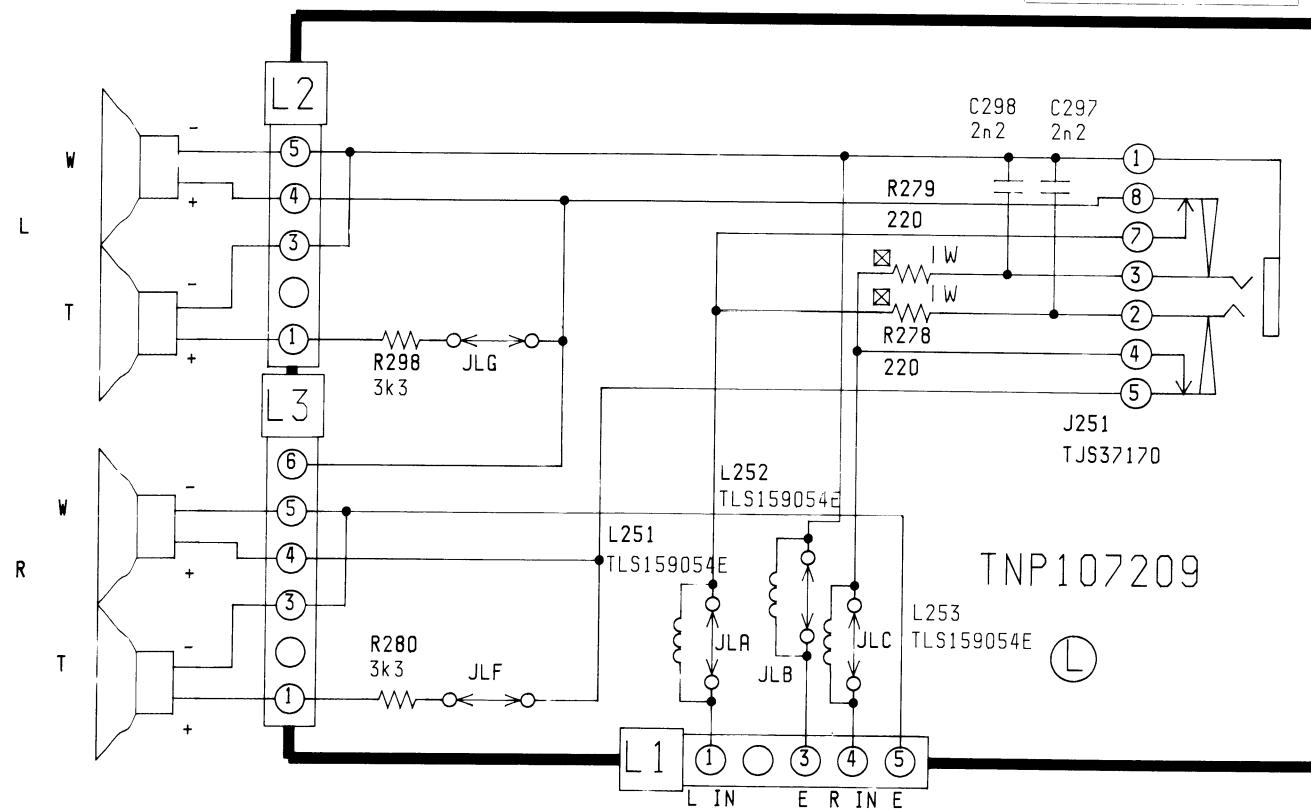
C SCHEMATIC SCHALTBILD C



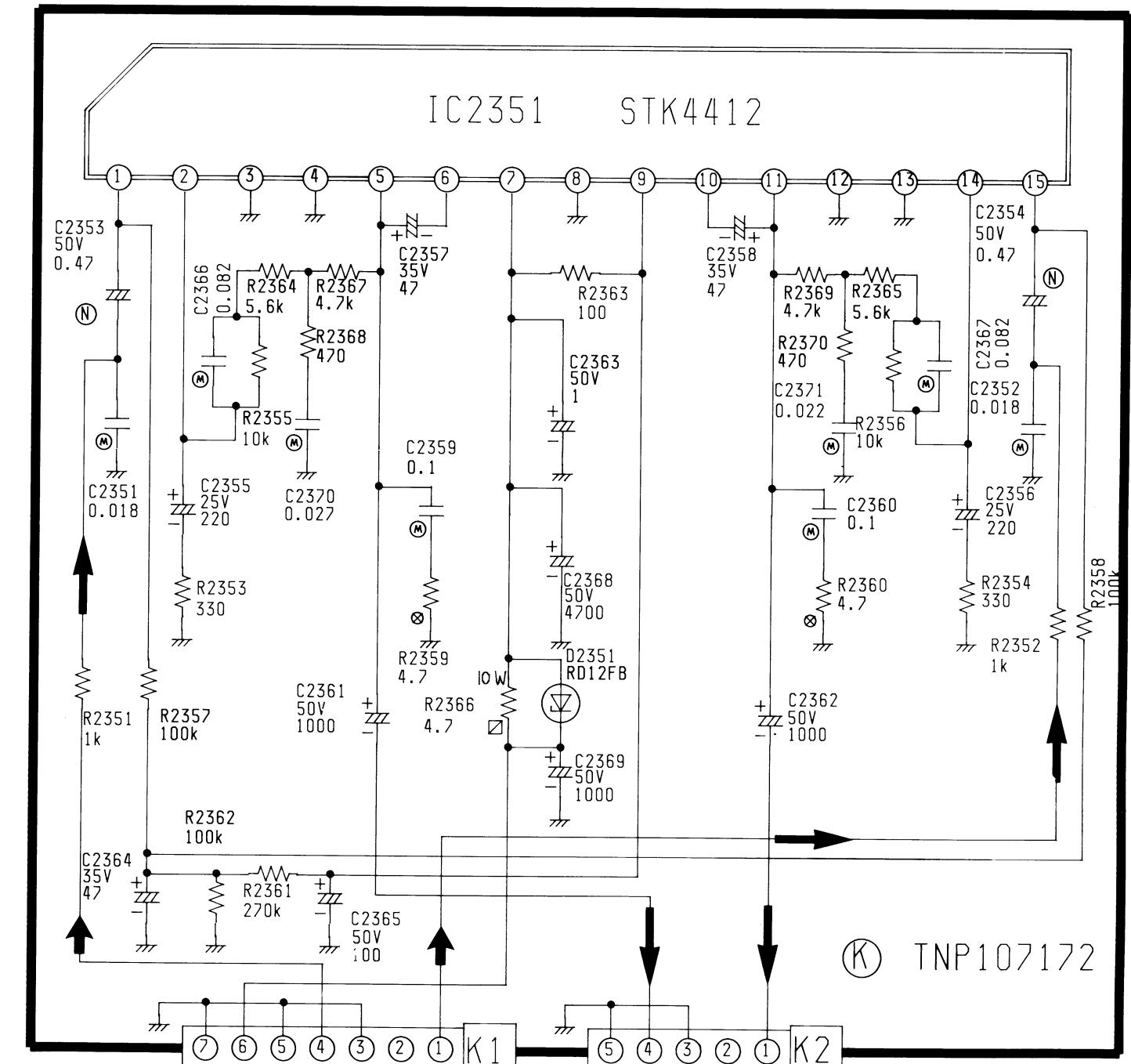
L SCHEMATIC SCHALTBILD L

UR MODELS ONLY.
JLA, JLB, JLC.

DRS MODELS ONLY.
L251, L252, L253, C297, C298

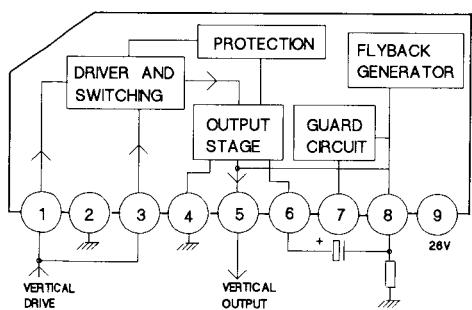


K SCHEMATIC SCHALTBILD K

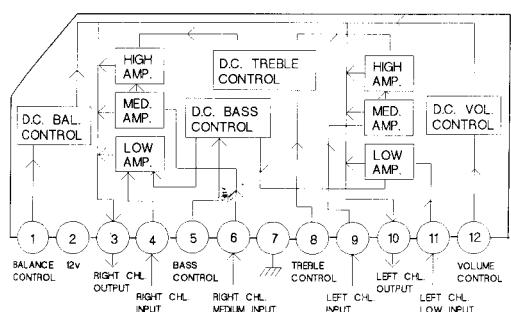


IC BLOCK DIAGRAM

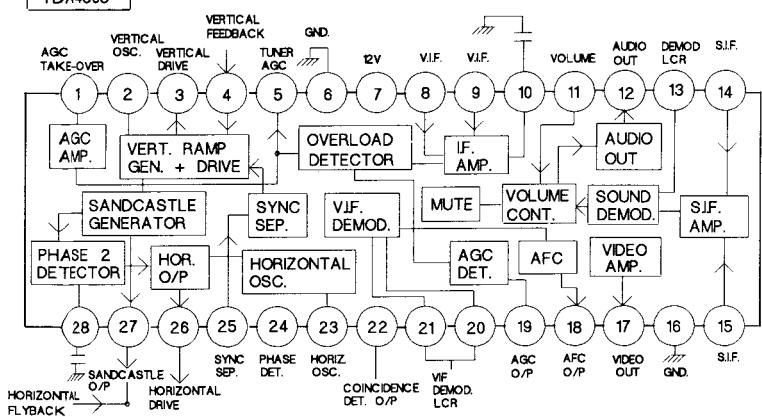
TDA3653/4



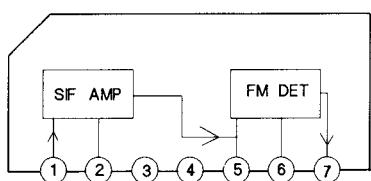
AN 5836 IC201



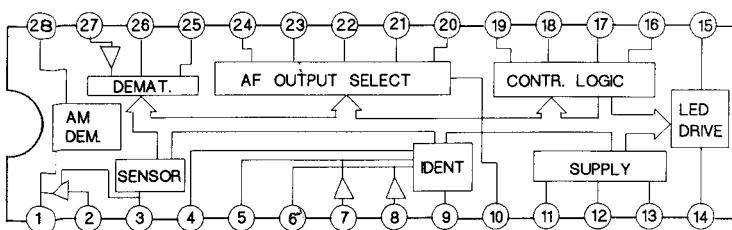
IC101
TDA4505



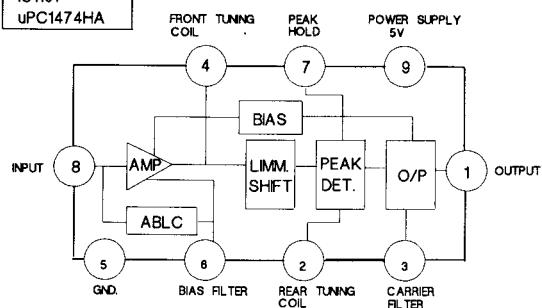
IC2203
AN5215



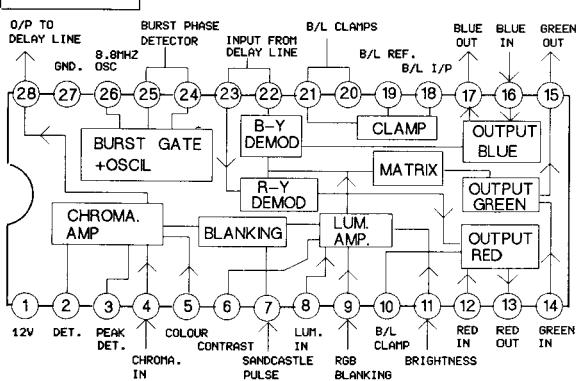
IC2202
TDA3803A



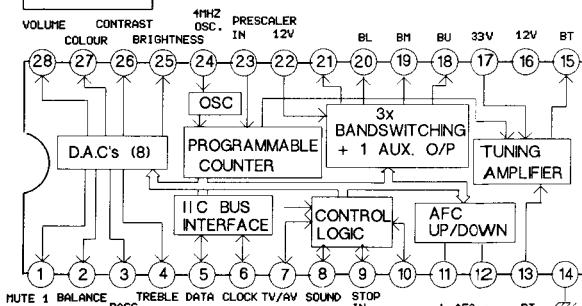
IC1101
uPC1474HA



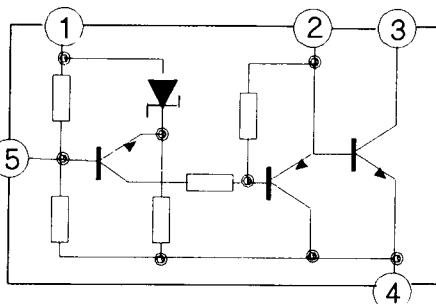
TDA3562A



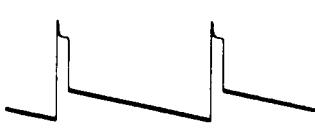
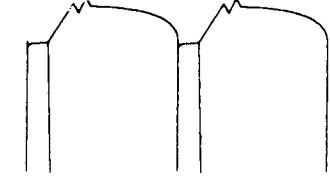
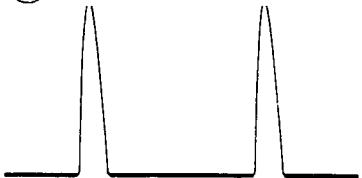
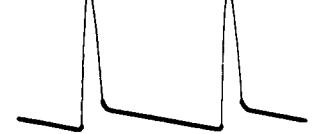
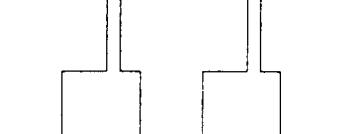
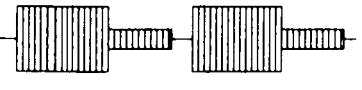
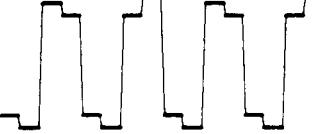
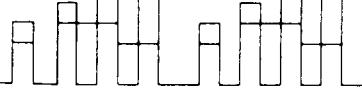
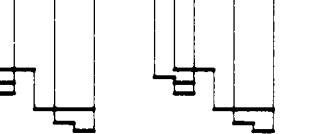
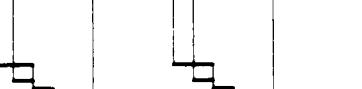
IC171
SAB3035



STR54041M
IC801



WAVEFORM PATTERN TABLE
SIGNALTABELLE

<p>① PIN 5 1C451</p>  <p>36Vp-p (5ms)</p>	<p>② BASE Q551</p>  <p>8Vp-p (20μs)</p>	<p>③ COLLECTOR Q551</p>  <p>320Vp-p (20μs)</p>
<p>④ PIN 1 T551</p>  <p>55Vp-p (20μs)</p>	<p>⑤ PIN 8 T551</p>  <p>14Vp-p (20μs)</p>	<p>⑥ PIN 7 1C601</p>  <p>5.5Vp-p (20μs)</p>
<p>⑦ PIN 8 1C601</p>  <p>25mVp-p (20μs)</p>	<p>⑧ PIN 16 1C601</p>  <p>1Vp-p (20μs)</p>	<p>⑨ PIN 14 1C601</p>  <p>24mVp-p (5ms)</p>
<p>⑩ PIN 13 1C601</p>  <p>16mVp-p (5ms)</p>	<p>⑪ TPE17</p>  <p>2.8Vp-p (20μs)</p>	<p>⑫ TPE16</p>  <p>1.7Vp-p (20μs)</p>
<p>⑬ TPE15</p>  <p>4.0Vp-p (20μs)</p>	<p>⑭ TPY3</p>  <p>34Vp-p (20μs)</p>	<p>⑮ TPY1</p>  <p>36Vp-p (20μs)</p>
<p>⑯ TPY2</p>  <p>30Vp-p (20μs)</p>		

SERVICE HINTS

HELPFUL HINTS FOR THE H-BOARD

To service the H-board, proceed as follows.

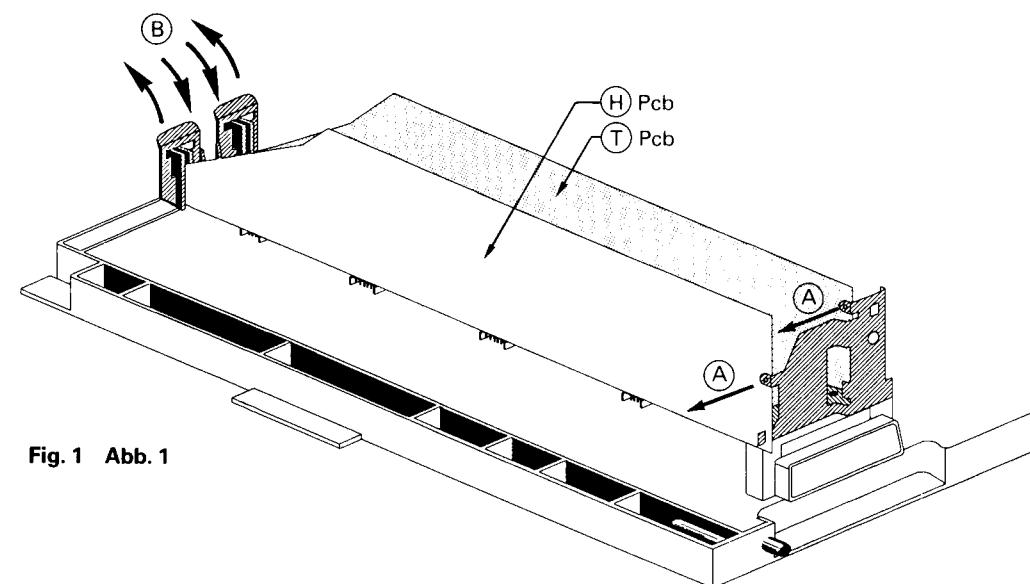


Fig. 1 Abb. 1

1. Remove plastic rivet (A) and release the plastic support bracket (B). Refer to Fig. 1
2. Remove (H) PCB to allow access to main (E) board. Refer to Fig. 2

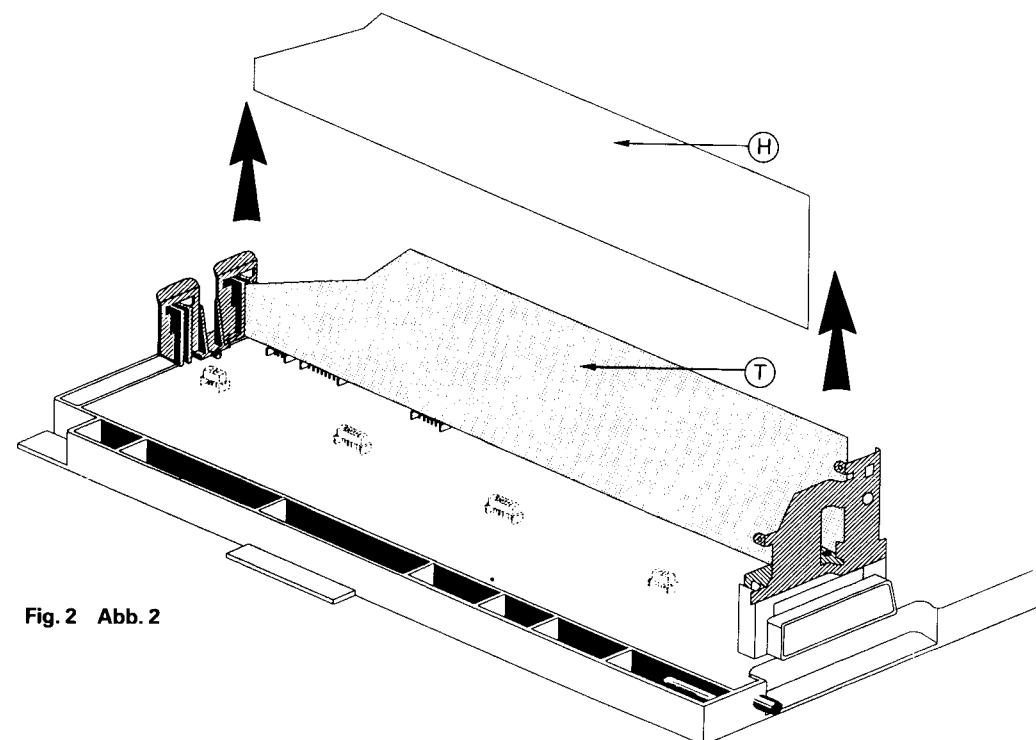


Fig. 2 Abb. 2

WARTUNGSHINWEISE

HINWEISE FÜR DIE H-PLATTE

Zur Wartung der H-Platte wie folgt vorgehen.

3. To allow easy service of (H) board. The Teletext board must be removed, refer to section 1. If the receiver is to operate without the Teletext PCB, a jumper wire has to be inserted into position JEO. Refer to Fig. 3

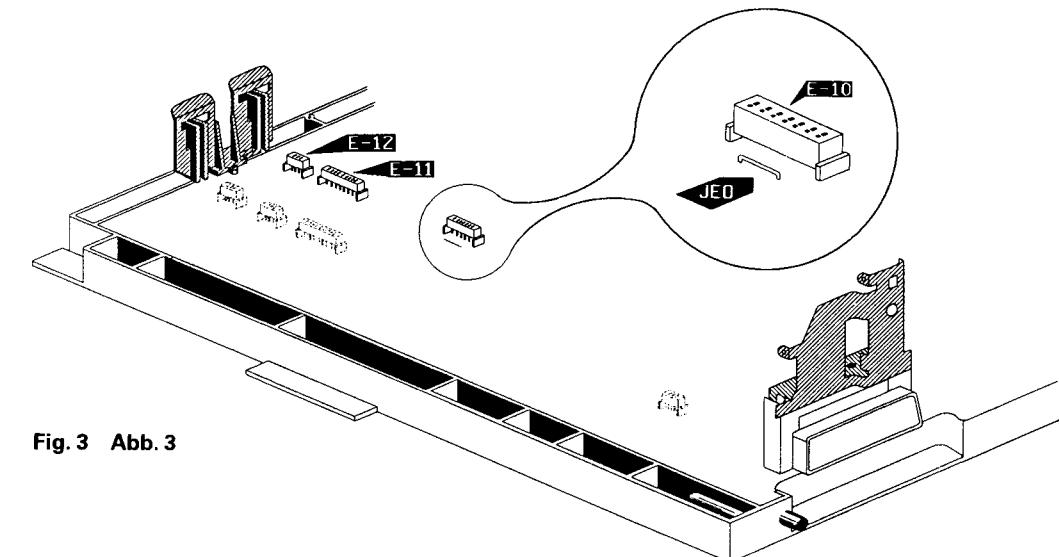


Fig. 3 Abb. 3

4. Replace (H) board and carry out service as required.
4. Setzen sie nun die (H)Platine wieder ein, um die notwendigen Reparaturarbeiten durchzuführen.

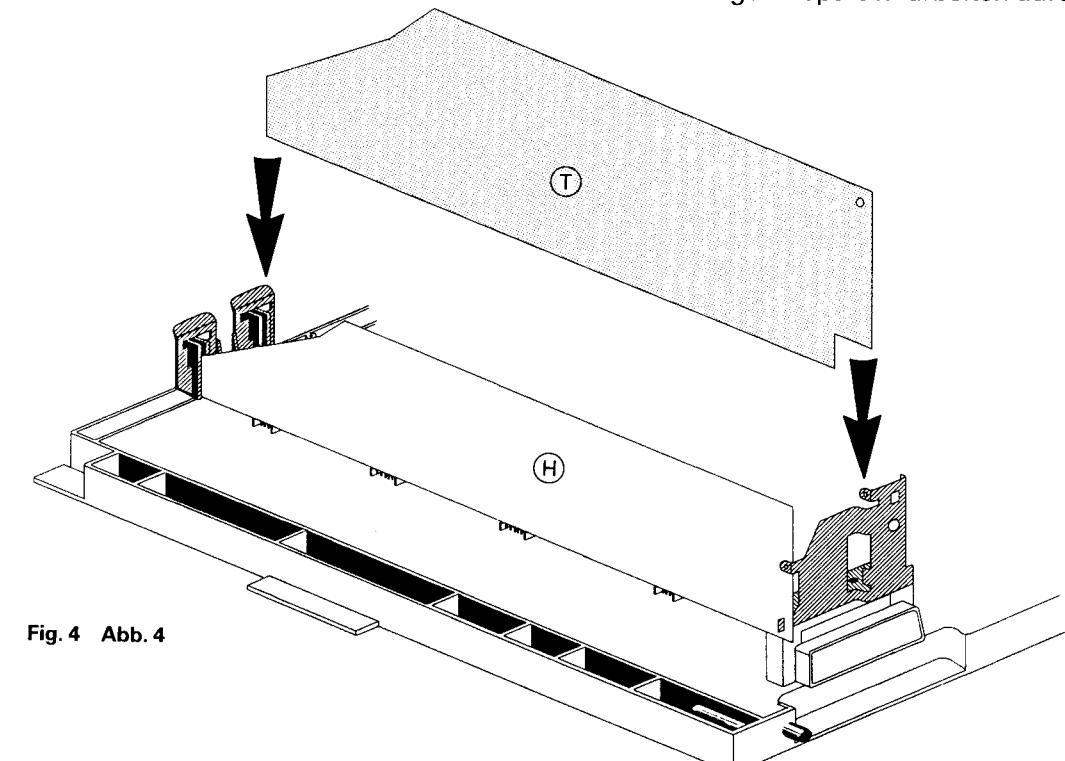
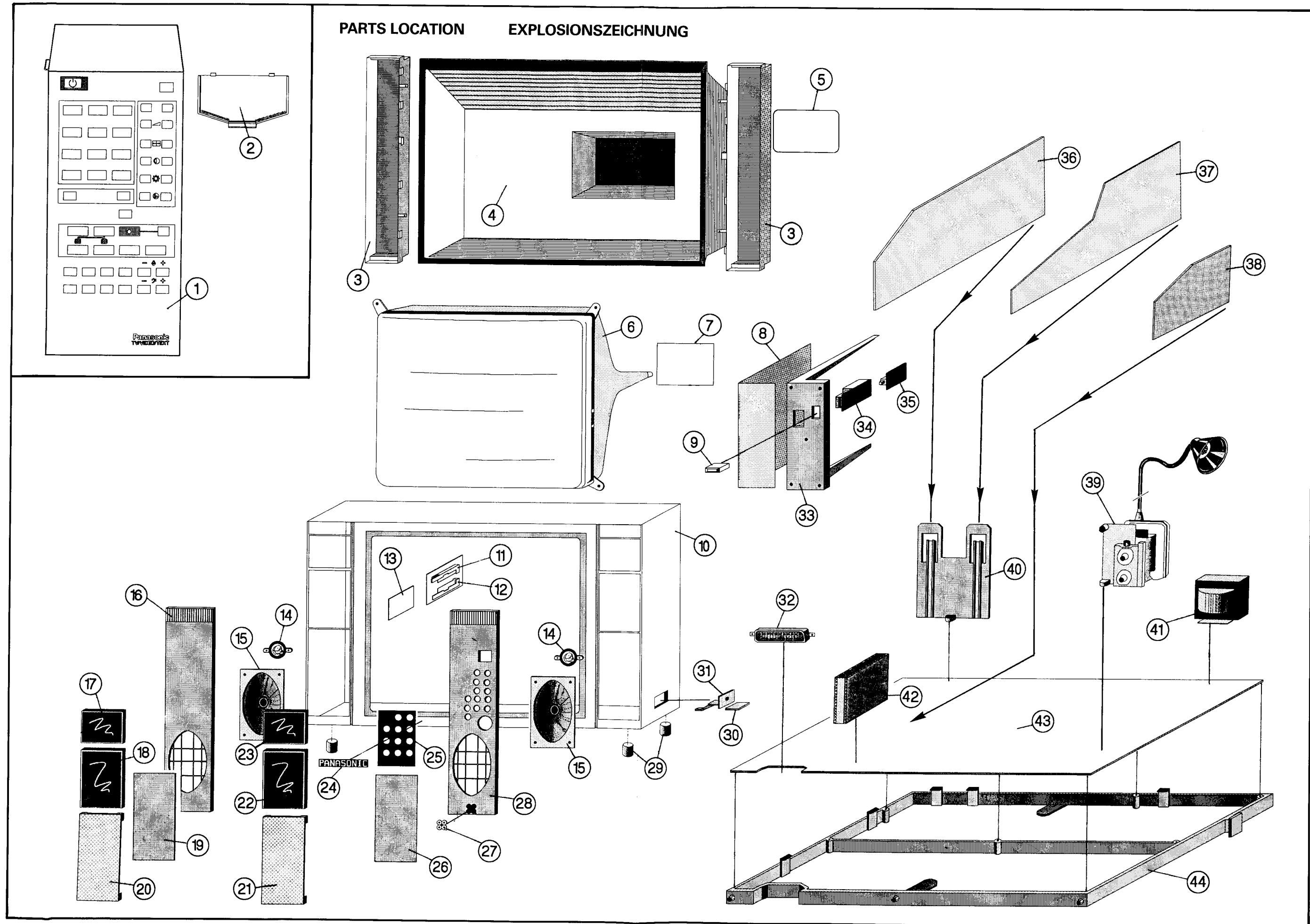


Fig. 4 Abb. 4

5. After servicing remove jumper from position JEO, replace (T) PCB, taking care to refit the plastic rivets and returning all wiring to its original position. Refer to Fig. 4.
6. NOTE: To service the (T) Board from the print side of the PCB, the (H) Board may be removed completely from the chassis. (No additional jumper wires required). With (H) Board removed, video will be present but no sound.
5. Nach erfolgter Reparatur die Brücke JEO entfernen und (T)Platine einsetzen. Kunststoffhalterung A anbringen und auf richtigen Sitz der Steckerleisten und der Kabelbäume achten. Siehe Abbildung 4.
6. Reparaturarbeiten an der (T)Platine können ausgeführt werden, indem die (H)Platine komplett herausgenommen wird. (Siehe Abschnitt 1). Das Gerät kann so in Betrieb genommen werden. (Zusätzliche Verbindungen oder Brücken sind nicht erforderlich). IN DIESER BETRIEBSART IST DAS AUDIOSIGNAL NICHT VORHANDEN!!!



REPLACEMENTS PARTS LIST

ERSATZTEILLISTE

Important Safety Notice

Components identified by  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Wichtiger Sicherheitshinweis

Teile, die mit einem Hinweis  gekennzeichnet sind, sind wichtig für die Sicherheit. Sollte ein Auswechseln erforderlich sein, sind unbedingt Originalteile einzusetzen.

Ref No.	Part No.	Description
MECHANICAL PARTS		
1)	TNQ8E0402	transmitter
2)	TQE17504	battery cover
11)	TMZ179959	K P.C.B. bracket (top)
12)	TMZ179958	K P.C.B. bracket (btm)
13)	◊ TNP107172AA	K P.C.B.
15)	EAS16D122-G	Speaker
17)	TKP2717214	smoke panel (left)
18)	TKP2718161	smoked panel cover
22)	TKP2717229	control panel lid
23)	TKP2717215	smoked panel (right)
24)	TBM17390-2	Panasonic badge
25)	TBM120323	preset panel
27)	TBM17461	Q badge
29)	TBL171306	set feet
30)	TKK179702-6	headphone lid black
31)	TKK178599-1	headphone bracket black
32)	TJS118900	AV terminal
33)	TMW27144	control bracket
34)	◊ TNP107208AA	R P.C.B.
36)	◊ TNP107184	H P.C.B.
27)	◊ TNP107058AB	T P.C.B.
39)	T551◊ TLF15505F	F.B. Transformer
40)	TMX17111-1	H+T P.C.B. support
41)	T801 ETS49K409A	transformer
44)	TMX17110	chassis frame
	TBM179005	blind sheet
	TBM179006	blind sheet
	TBY17521	body
	TBY27128	ornament
	TKK769906	door catcher
	520-001	fuse holder
	◊ TNP107106AA	N P.C.B.

2878 DRS ONLY

R221	ERGI ANJ101H	metal oxide	100n	± 5%	1W
R457	ERDS2TJ121	carbon	120n	± 5%	1W
R477	ERDS2TJ562	carbon	5k6n	± 5%	1W
R553	◊ ERQ14AJ3R3P	fusible	3.3n	± 5%	1W
R604	ERDS2TJ223T	carbon	22kn	± 5%	1W
R654	ERDS2TJ152	carbon	1k5n	± 5%	1W
R655	ERDS2TJ152	carbon	1k5n	± 5%	1W
R656	ERDS2TJ222	carbon	2k2n	± 5%	1W
R657	ERDS2TJ102	carbon	1kn	± 5%	1W
R658	EVND4AA00B13	control	1knB		
R661	ERDS2TJ562	carbon	5k6n	± 5%	1W
R662	ERDS2TJ471	carbon	470n	± 5%	1W
R663	ERDS2TJ101	carbon	100n	± 5%	1W
R664	ERDS2TJ331	carbon	330n	± 5%	1W
R665	ERDS2TJ182	carbon	1k8n	± 5%	1W
R666	ERDS2TJ152	carbon	1k5n	± 5%	1W
R672	ERDS2TJ272	carbon	2k7n	± 5%	1W
C217	ECEA1CU222E	electrolytic	2200 μ F	16V	
C297	ECQMI H222KV3	plastic film	2.2 nF	50V	
C298	ECQMI H222KV3	plastic film	2.2 nF	50V	
C553	ECEA2CS2R2E	electrolytic	2.2 μ F	160V	
C651	ECQV1H104JZ3	plastic film	100 nF	50V	
C652	ECKR1H103ZF5	ceramic	10 nF	50V	
C653	ECCR1H391JP	ceramic	390 pF	50V	
C654	ECCR1H101K5	ceramic	100 pF	50V	
C655	ECQV1H104JZ3	plastic film	100 nF	50V	
C656	ECKR1H102KB5	ceramic	1 nF	50V	
C657	ECKR1H102KB5	ceramic	1 nF	50V	
C658	ECEA1HU010B	electrolytic	1 μ F	50V	
C659	ECKR1H392KB5	ceramic	3.9 nF	50V	
C660	ECEA50ZR1B	electrolytic	0.1 μ F	50V	
C661	ECQMI H223JV3	plastic film	22 nF	50V	
C663	ECEA1HU010B	electrolytic	1 μ F	50V	
C664	ECKR1H471KB5	ceramic	470 pF	50V	
C665	ECCR1H560K5	ceramic	56 pF	50V	
C666	ECQV1H104JZ3	plastic film	100 nF	50V	

Ref No.	Part No.	Description
2878UR ONLY		
C667	ECQV1H104JZ3	plastic film
C668	ECCR1H181JC	ceramic
C669	ECKR1H221KB5	ceramic
C670	ECKR1H221KB5	ceramic
C674	ECCR1H330J5	ceramic
C801	ECQE2A334MWB	plastic film
C813	◊ ECKCNS332MEJ	ceramic
DL651	ELT10Z235	delay line
	TVSRD12FB1V	diode
L251	TLS159054E	coil
L252	TLS159054E	coil
L253	TLS159054E	coil
L651	TLK151060	coil
L655	TLK61008-1	coil
L656	TLT100K991R	coil
L657	TLT100K991R	coil
Q651	2SC1685TA	N.P.N. transistor
Q652	2SA564ATA	P.N.P. transistor
IC651	TDA3590A	I.C.
X601	TSS2002-D	crystal
4)	TKU286800	back cover
5)	TBM120001	back cover label
6)	A66EAK00X01	F.S.T. C.R.T
7)	TNP107199AC	Y. P.C.B
8)	TNP107173AA	M. P.C.B
10)	TXFKYMELO002-8	cabinet
14)	EAS5FP10AD	tweeter
16)	TKP2717441	panel (left)
19)	TMK18010	speaker felt
20)	TKP1756911	punched net
21)	TKP1756911	punched net
26)	TMK18010	speaker felt
28)	TKP2717431	control panel (right)
35)	◊ TNP107061AC	P.P.C.B.
38)	◊ TNP107060AA	C.P.C.B.
42)	◊ ENV57465G2	tuner
43)	◊ TNP197010AJ	E.P.C.B.
	◊ TNP107209AB	L.P.C.B.
	TPC1840101	outer carton
	TQ88E0326	operating instruction book
	◊ TSX3183-2	A.C. cord
	TXFLK01RTG	degausing coil
2878UR ONLY		
C305	ECCR1H391J5	ceramic
C217	ECEA1CU102E	electrolytic
C553	ECEA2CS4R7E	electrolytic
C831	ECKCNS102MBJ	ceramic
C813	◊ ECKCNS222MEJ	ceramic
C612	ECKR1H103ZF5	ceramic
C801	ECQU2A473MNB	plastic film
C802	ECQU2A473MNB	plastic film
R457	ERDS2TJ101T	carbon
R301	ERDS2TJ152T	carbon
R604	ERDS2TJ183T	carbon
R477	ERDS2TJ473T	carbon
R221	ERG2ANJ330H	metal oxide
		33n ± 5% 2W
D2614	MA165TA5	diode
L807	TLQ470K236B	coil
X601	TSS2003-M	crystal
4)	TKU286800	back cover
5)	TBM120003	back cover label
6)	A66EAK00X01	F.S.T. C.R.T.

Ref No.	Part No.	Description
7)	§ TNP107199AC	Y P.C.B
8)	§ TNP107173AA	M P.C.B
10)	TXFKYMELO005-5	cabinet
14)	EAS5FP10AD	tweeter
16)	TKP2717441	control panel (left)
19)	TMK18010	speaker felt
20)	TKP1756911	punched net
21)	TKP1756911	punched net
22)	TMK18010	speaker felt
28)	§ TNP2717431	control panel (right)
35)	§ TNP107061AA	P P.C.B.
36)	§ TNP107184	H P.C.B.
38)	§ TNP107060AA	C P.C.B
42)	§ ENV57465G2C	tuner
43)	§ TNP197010AC	E P.C.B.
	§ TNP107209AD	L P.C.B.
	TPC1840103	outer carton
	TQB8E0327	operating instruction book
	§ TSX2197-1	A.C. cord
	TXFLK01RTG	degausing coil

2478UR ONLY

R301	ERDS2TJ152	carbon	1k5Ω ± 5%	1/4W
R604	ERDS2TJ183	carbon	18kΩ ± 5%	1/4W
C305	ECCR1H391J5	ceramic	390 pF	50v
C612	ECCR1H103ZF5	ceramic	10 nF	50v
C801	ECQU2A473MN8	plastic film	47 nF	200v
C802	ECQU2A473MN8	plastic film	47 nF	200v
C813	§ ECKCNS222MEJ	ceramic	2.2 nF	1.2kv
C831	§ ECKCNS102MBJ	ceramic	1 nF	1.2kv
L807	TLQ470K236B	coil		
3)	TKU521900	sub back cover		
4)	§ TKU288200	back cover		
5)	TBM120105	back cover label		
6)	§ A59EAK00X01	F.S.T. C.R.T.		
7)	§ TNP107199AC	Y P.C.B.		
8)	§ TNP107173AA	M P.C.B.		
10)	TXFKYMELO003-8	cabinet		
14)	EAS5FP10AA	tweeter		
16)	TKP2718461	control panel (left)		
19)	TMK27095	speaker felt		
20)	TKP1757241	speaker net		
21)	TKP1757241	speaker net		
26)	TMK27095	speaker felt		
28)	TKP2718451	control panel		
35)	§ TNP107061AA	P P.C.B.		
36)	§ TNP107184	H P.C.B.		
42)	§ ENV57465G2C	tuner		
43)	§ TNP197010AC	E P.C.B.		
F801	§ 195-3.15	3.15A fuse		
	§ TNP107106AA	N P.C.B.		
	§ TNP107172AA	K P.C.B.		
	§ TNP107209AD	L P.C.B.		
	TQB8E0327	operating instruction book		
	TPC1841401	outer carton		
	TPD191364	top cushion		
	TPD192366	bottom cushion		

2478DRS ONLY

R604	ERDS2TJ223	carbon	22kΩ ± 5%	1/4W
R654	ERDS2TJ152	carbon	1k5Ω ± 5%	1/4W
R655	ERDS2TJ152	carbon	1k5Ω ± 5%	1/4W
R656	ERDS2TJ222	carbon	2k2Ω ± 5%	1/4W
R657	ERDS2TJ102	carbon	1kΩ ± 5%	1/4W
R658	EVND4AA00B13	control	1kΩB	
R661	ERDS2TJ562	carbon	5k6Ω ± 5%	1/4W
R662	ERDS2TJ471	carbon	470Ω ± 5%	1/4W
R663	ERDS2TJ101	carbon	100Ω ± 5%	1/4W
R664	ERDS2TJ331	carbon	330Ω ± 5%	1/4W
R665	ERDS2TJ182	carbon	1k8Ω ± 5%	1/4W
R666	ERDS2TJ152	carbon	1k5Ω ± 5%	1/4W
R672	ERDS2TJ272	carbon	2k7Ω ± 5%	1/4W
Q651	2SC1685TA	N.P.N. transistor		
Q652	2SA564ATA	P.N.P. transistor		
C297	ECQM1H222KV3	plastic film	2.2 nF	50v
C298	ECQM1H222KV3	plastic film	2.2 nF	50v
C661	ECQM1H223JV3	plastic film	22 nF	50v
C651	ECQV1H104JZ3	plastic film	100 nF	50v
C655	ECQV1H104JZ3	plastic film	100 nF	50v
C666	ECQV1H104JZ3	plastic film	100 nF	50v
C667	ECQV1H104JZ3	plastic film	100 nF	50v
C652	ECCR1H103ZF5	ceramic	10 nF	50v
C656	ECCR1H102KB5	ceramic	1 nF	50v

Ref No.	Part No.	Description
C813	§ ECKCNS332MEJ	ceramic
C654	ECCR1H101K5	ceramic
C657	ECCR1H102KB5	ceramic
C658	ECEA1HU010B	electrolytic
C660	ECEA50ZR1B	electrolytic
C668	ECCR1H181JC	ceramic
C674	ECCR1H330J5	ceramic
C305	ECCR1H561KB5	ceramic
C653	ECCR1H391JP	ceramic
C663	ECEA1HU010B	electrolytic
C665	ECCR1H560K5	ceramic
C662	ECEA1CU100B	electrolytic
C669	ECCR1H221KB5	ceramic
C670	ECCR1H221KB5	ceramic
C659	ECCR1H392KB5	ceramic
C664	ECCR1H471KB5	ceramic
C801	ECQE2A334MWB	plastic film
DL651	ELT10Z235	coil

L251	TLS159054E	coil
L252	TLS159054E	coil
L253	TLS159054E	coil
L651	TLK151060	coil
L655	TLK61008-1	coil
L656	TLT100K991R	coil
L657	TLT100K991R	coil
L809	TLQ010L236B	coil
IC651	TDA3590A	I.C.
3)	TKU521900	sub back cover
4)	§ TKU288200	back cover
5)	TBM120389	back cover label
6)	§ A59EAK00X01	F.S.T. C.R.T.
7)	§ TNP107199AC	Y P.C.B.
8)	§ TNP107173AA	M P.C.B.
10)	TXFKYMELO003-8	cabinet
11)	EAS5FP10AD	tweeter
16)	TKP2718461	panel : left
19)	TMK27098	speaker felt
20)	TKP1757241	punched net
21)	TKP1757241	punched net
26)	TMK27098	speaker net
28)	TKP2718451	control panel (right)
32)	§ TNP107061AC	P P.C.B.
35)	§ TNP107060AA	C P.C.B.
36)	§ TNP107184	H P.C.B.
39)	§ ENV57465G2	tuner
40)	§ TNP197010AJ	E P.C.B.
	TPC1841402	outer carton
	TQB8E0326	operating instruction book
	§ TSX3183-2	A.C. cord
	TXFLK01RTG	degausing coil

RESISTORS

R13	ERDS2TJ470	carbon	47Ω ± 5%	1/4W
R21	ERDS2TJ562	carbon	5k6Ω ± 5%	1/4W
R22	ERDS2TJ562	carbon	5k6Ω ± 5%	1/4W
R23	ERDS2TJ821	carbon	820Ω ± 5%	1/4W
R24	ERDS2TJ220	carbon	22Ω ± 5%	1/4W
R25	ERDS2TJ101	carbon	100Ω ± 5%	1/4W
R70	ERG1ANJ273H	metal oxide	27kΩ ± 5%	1W
R71	ERD25TJ221	carbon	220Ω ± 5%	1W
R102	EVND4AA00B14	control	10kΩB	
R103	ERDS2TJ392	carbon	3k9Ω ± 5%	1/4W
R104	ERDS2TJ272	carbon	2k7Ω ± 5%	1/4W
R106	ERDS2TJ471	carbon	470Ω ± 5%	1/4W
R110	ERDS2TJ101	carbon	100Ω ± 5%	1/4W
R111	ERDS2TJ122	carbon	1k2Ω ± 5%	1/4W
R112	ERDS2TJ155	carbon	15MΩ ± 5%	1/4W
R113	ERDS2TJ223	carbon	22kΩ ± 5%	1/4W
R115	ERDS2TJ472	carbon	4k7Ω ± 5%	1/4W
R116	ERDS2TJ391	carbon	390Ω ± 5%	1/4W
R119	ERDS2TJ684	carbon	680kΩ ± 5%	1/4W
R120	ERD25TJ471	carbon	470Ω ± 5%	1/4W
R122	ERDS2TJ472	carbon	4k7Ω ± 5%	1/4W
R123	ERDS2TJ105	carbon	1MΩ ± 5%	1/4W
R124	ERDS2TJ562	carbon	5k6Ω ± 5%	1/4W
R126	ERDS2TJ222	carbon	2k2Ω ± 5%	1/4W
R127	ERDS2TJ562	carbon	5k6Ω ± 5%	1/4W
R128	ERDS2TJ562	carbon	5k6Ω ± 5%	1/4W
R129	ERDS2TJ821	carbon	820Ω ± 5%	1/4W
R130	ERDS2TJ330	carbon	33Ω ± 5%	1/4W

Ref No.	Part No.	Description			
R132	ERDS2TJ473	carbon	47k Ω	\pm 5%	1W
R134	ERQ14AJ2R2P	fusible	2.2k Ω	\pm 5%	1W
R171	ERDS2TJ103	carbon	10k Ω	\pm 5%	1W
R177	ERDS2TJ102	carbon	1k Ω	\pm 5%	1W
R178	ERDS2TJ102	carbon	1k Ω	\pm 5%	1W
R179	ERDS2TJ102	carbon	1k Ω	\pm 5%	1W
R180	ERDS2TJ562	carbon	5k6 Ω	\pm 5%	1W
R181	ERDS2TJ103	carbon	10k Ω	\pm 5%	1W
R182	ERDS2TJ562	carbon	5k6 Ω	\pm 5%	1W
R184	ERD25TJ221	carbon	220 Ω	\pm 5%	1W
R185	ERD25TJ221	carbon	220 Ω	\pm 5%	1W
R188	ERGI SJ101H	metal oxide	100 Ω	\pm 5%	1W
R204	ER0S2TKF2871	metal film	2.87k Ω	\pm 1%	1W
R211	ERDS2TJ102	carbon	1k Ω	\pm 5%	1W
R212	ERDS2TJ182	carbon	1k8 Ω	\pm 5%	1W
R213	ERDS2TJ182	carbon	1k8 Ω	\pm 5%	1W
R214	ERDS2TJ102	carbon	1k Ω	\pm 5%	1W
R215	ERDS2TJ562	carbon	5k6 Ω	\pm 5%	1W
R216	ERDS2TJ562	carbon	5k6 Ω	\pm 5%	1W
R218	ERDS2TJ153	carbon	15k Ω	\pm 5%	1W
R278	ERGI ANJ221H	metal oxide	220 Ω	\pm 5%	1W
R279	ERGI ANJ221H	metal oxide	220 Ω	\pm 5%	1W
R280	ERDS2TJ331	carbon	330 Ω	\pm 5%	1W
R298	ERDS2TJ331	carbon	330 Ω	\pm 5%	1W
R302	ERDS2TJ561	carbon	560 Ω	\pm 5%	1W
R303	ERDS2TJ272	carbon	2k7 Ω	\pm 5%	1W
R304	EVND4AA00B52	control	500 Ω B		
R305	ERDS2TJ152	carbon	1k5 Ω	\pm 5%	1W
R306	ERDS2TJ222	carbon	2k2 Ω	\pm 5%	1W
R307	ERDS2TJ561	carbon	560 Ω	\pm 5%	1W
R316	ERDS2TJ471	carbon	470 Ω	\pm 5%	1W
R317	EVND4AA00B54	control	50k Ω B		
R318	ERDS2TJ274	carbon	270k Ω	\pm 5%	1W
R319	ERDS2TJ563	carbon	56k Ω	\pm 5%	1W
R321	EVND4AA00B24	control	20k Ω B		
R322	ERDS2TJ563	carbon	56k Ω	\pm 5%	1W
R324	ERDS2TJ393	carbon	39k Ω	\pm 5%	1W
R326	ERDS2TJ101	carbon	100 Ω	\pm 5%	1W
R327	ERDS2TJ121	carbon	120 Ω	\pm 5%	1W
R329	ERDS2TJ682	carbon	6k8 Ω	\pm 5%	1W
R330	ERDS2TJ103	carbon	10k Ω	\pm 5%	1W
R332	ERDS2TJ103	carbon	10k Ω	\pm 5%	1W
R333	ERDS2TJ103	carbon	10k Ω	\pm 5%	1W
R334	ERD25TJ103	carbon	10k Ω	\pm 5%	1W
R335	ERDS1TJ471	carbon	470 Ω	\pm 5%	1W
R336	ERDS2TJ473	carbon	47k Ω	\pm 5%	1W
R337	ERD25TJ104	carbon	100k Ω	\pm 5%	1W
R338	ERDS2TJ102	carbon	1k Ω	\pm 5%	1W
R339	ERDS2TJ392	carbon	3k9 Ω	\pm 5%	1W
R340	ERD25TJ331	carbon	330 Ω	\pm 5%	1W
R341	ERDS2TJ184	carbon	180k Ω	\pm 5%	1W
R342	ERDS2TJ274	carbon	270k Ω	\pm 5%	1W
R343	ERD25TJ333	carbon	33k Ω	\pm 5%	1W
R344	ERDS2TJ682	carbon	6k8 Ω	\pm 5%	1W
R345	ER025TKF7151	metal film	7.15k Ω	\pm 1%	1W
R346	ER025TKF3001	metal film	3k Ω	\pm 1%	1W
R348	ERDS2TJ102	carbon	1k Ω	\pm 5%	1W
R349	ERDS2TJ123	carbon	12k Ω	\pm 5%	1W
R351	ERG2ANJ822H	metal oxide	8k2 Ω	\pm 5%	2W
R352	ERG2ANJ822H	metal oxide	8k2 Ω	\pm 5%	2W
R353	ERG2ANJ822H	metal oxide	8k2 Ω	\pm 5%	2W
R354	ERDS2TJ181	carbon	180 Ω	\pm 5%	1W
R355	ERDS2TJ271	carbon	270 Ω	\pm 5%	1W
R356	ERDS2TJ181	carbon	180 Ω	\pm 5%	1W
R357	EVN65AA00B22	control	200 Ω B		
R358	EVN65AA00B22	control	200 Ω B		
R359	ERDS2TJ471	carbon	470 Ω	\pm 5%	1W
R360	ERDS2TJ471	carbon	470 Ω	\pm 5%	1W
R361	ERDS2TJ471	carbon	470 Ω	\pm 5%	1W
R362	EVN65AA00B53	control	5k Ω B		
R364	EVN65AA00B53	control	5k Ω B		
R365	ERDS1TJ152	carbon	1k5 Ω	\pm 5%	1W
R366	ERDS1TJ152	carbon	1k5 Ω	\pm 5%	1W
R367	ERDS1TJ152	carbon	1k5 Ω	\pm 5%	1W
R369	EVN65AA00B53	control	5k Ω B		
R401	ERDS2TJ101	carbon	100 Ω	\pm 5%	1W
R402	ERD25TJ824	carbon	820k Ω	\pm 5%	1W
R423	ERD25TJ105	carbon	1M Ω	\pm 5%	1W
R424	ERD25VJ395	carbon	3.9M Ω	\pm 5%	1W
R425	ERDS2TJ563	carbon	56k Ω	\pm 5%	1W
R452	ERDS2TJ182	carbon	1k8 Ω	\pm 5%	1W
R454	ERDS2TJ272	carbon	2k7 Ω	\pm 5%	1W

Ref No.	Part No.	Description		
R455	ERDS2TJ470	carbon	47 Ω	\pm 5%
R456	EVND4AA00B22	control	200 Ω B	
R458	ERD25TJ302	carbon	3k Ω	\pm 5%
R459	ERDS2TJ332	carbon	3k3 Ω	\pm 5%
R461	ERDS2TJ1R8	carbon	1.8 Ω	\pm 5%
R462	ERDS2TJ1R8	carbon	1.8 Ω	\pm 5%
R463	ERD25TJ223	carbon	22k Ω	\pm 5%
R464	ERDS2TJ561	carbon	560 Ω	\pm 5%
R469	ERDS2TJ471	carbon	470 Ω	\pm 5%
R470	ERG2SJ391H	metal oxide	390 Ω	\pm 5%
R471	ERDS1TJ182	carbon	1k8 Ω	\pm 5%
R472	ERD25TJ123	carbon	12k Ω	\pm 5%
R473	ERDS2TJ152	carbon	1k5 Ω	\pm 5%
R474	ERDS1TJ471	carbon	470 Ω	\pm 5%
R475	ERDS1TJ152	carbon	1k5 Ω	\pm 5%
R476	ERDS2TJ823	carbon	82k Ω	\pm 5%
R483	ERDS2TJ512	carbon	5k1 Ω	\pm 5%
R484	TSF19801	fuse		
R485	ERQ12HKR39P	fusible	0.39 Ω	\pm 5%
R502	ERD25TJ124	carbon	120k Ω	\pm 5%
R503	ER0S2TKF3002	metal film	30k Ω	\pm 1%
R504	EVND4AA00B14	control	10k Ω B	
R505	ERD25TJ123	carbon	12k Ω	\pm 5%
R506	ERDS2TJ302	carbon	3k Ω	\pm 5%
R507	ERDS2TJ272	carbon	2k7 Ω	\pm 5%
R509	ERD25TJ333	carbon	33k Ω	\pm 5%
R510	ERDS2TJ333	carbon	33k Ω	\pm 5%
R511	EVND4AA00B34	control	30k Ω B	
R513	ERD25TJ102	carbon	1k Ω	\pm 5%
R514	ERDS2TJ562	carbon	5k6 Ω	\pm 5%
R515	ERDS2TJ471	carbon	470 Ω	\pm 5%
R519	ERD25TJ104	carbon	100k Ω	\pm 5%
R520	ERDS2TJ153	carbon	15k Ω	\pm 5%
R521	ERDS2TJ182	carbon	1k8 Ω	\pm 5%
R522	ERDS2TJ103	carbon	10k Ω	\pm 5%
R526	ERDS2TJ822	carbon	8k2 Ω	\pm 5%
R530	ERW12PKR33C	wirewound	0.33 Ω	\pm 5%
R532	ERDS2TJ562	carbon	5k6 Ω	\pm 5%
R533	ERG2ANJ391H	metal oxide	390 Ω	\pm 5%
R534	ERDS2TJ332	carbon	3k3 Ω	\pm 5%
R535	ERDS2TJ103	carbon	10k Ω	\pm 5%
R536	ERD25TJ333	carbon	33k Ω	\pm 5%
R539	ERDS2TJ101	carbon	100 Ω	\pm 5%
R542	ERDS2TJ474	carbon	470k Ω	\pm 5%
R543	ERDS2TJ103	carbon	10k Ω	\pm 5%
R545	ERDS2TJ103	carbon	10k Ω	\pm 5%
R551	ERF7ZJ100	wirewound	10 Ω	\pm 5%
R554	ERQ12HJ121P	fusible	120 Ω	\pm 5%
R556	ERQ12HJ1R2P	fusible	1.2 Ω	\pm 5%
R557	ERQ1CJP6R8S	fusible	6.8 Ω	\pm 5%
R561	ERD25TJ153	carbon	15k Ω	\pm 5%
R562	ERDS2TJ154	carbon	150k Ω	\pm 5%
R564	ERD25FJ390	carbon	39 Ω	\pm 5%
R565	ERQ1CJP102S	fusible	1k Ω	\pm 5%
R567	TSF19102	fuse		
R568	ERDS2TJ274	carbon	270k Ω	\pm 5%
R602	ERDS2TJ222	carbon	2k2 Ω	\pm 5%
R606	EVND4AA00B14	control	10k Ω B	
R607	ERDS2TJ102	carbon	1k Ω	\pm 5%
R608	ERDS2TJ122	carbon	1k2 Ω	\pm 5%
R609	EVND4AA00B13	control	1k Ω B	
R610	ERDS2TJ391	carbon	390 Ω	\pm 5%
R611	ERDS2TJ471	carbon	470 Ω	\pm 5%
R612	ER0S2TKG1002	metal film	10k Ω	\pm 1%
R614	ER0S2TKG1002	metal film	10k Ω	\pm 1%
R616	ERD25TJ101	carbon	100 Ω	\pm 5%
R617	ERD25TJ101	carbon	100 Ω	\pm 5%
R618	ERD25TJ101	carbon	100 Ω	\pm 5%
R626	ERD25TJ183	carbon	18k Ω	\pm 5%
R628	ERDS2TJ682	carbon	6k8 Ω	\pm 5%
R629	ERDS2TJ513	carbon	51k Ω	\pm 5%
R672	ERDS2TJ272	carbon	2k7 Ω	\pm 5%
R751	ERDS2TJ154	carbon	150k Ω	\pm 5%
R752	ERDS2TJ123	carbon	12k Ω	\pm 5%
R753	ERDS2TJ333	carbon	33k Ω	\pm 5%
R754	ERDS2TJ224	carbon	220k Ω	\pm 5%
R756	ERDS2TJ103	carbon	10k Ω	\pm 5%
R757	ERDS2TJ102	carbon	1k Ω	\pm 5%
R758	EVND4AA00B24	control	20k Ω B	
R759	EVND4AA00B53	control	5k Ω B	
R760	ERDS2TJ222	carbon	2k2 Ω	\pm 5%
R761	ERDS2TJ183	carbon	18k Ω	\pm 5%

Ref No.	Part No.	Description	Value	Tolerance	Unit
R762	ERDS2TJ683	carbon	68k Ω	$\pm 5\%$	W
R764	ERDS2TJ274	carbon	270k Ω	$\pm 5\%$	W
R766	ERDS2TJ272	carbon	2k7 Ω	$\pm 5\%$	W
R767	ERGI ANJ471H	metal oxide	470 Ω	$\pm 5\%$	W
R768	ERDS2TJ152	carbon	1k5 Ω	$\pm 5\%$	W
R769	ERDS2TJ472	carbon	4k7 Ω	$\pm 5\%$	W
R770	ERQ12HJ220P	fusible	22 Ω	$\pm 5\%$	W
R802	ERF7ZK4R7	wirewound	4.7 Ω	$\pm 5\%$	W
R803	ERDS1TJ564	carbon	560k Ω	$\pm 5\%$	W
R810	ERQ1CJP3R3S	fusible	3.3 Ω	$\pm 5\%$	W
R811	ERWI2PKR33C	wirewound	0.33 Ω	$\pm 5\%$	W
R812	ERG2ANJ470H	metal oxide	47 Ω	$\pm 5\%$	W
R813	ERGI ANJ683H	metal oxide	68k Ω	$\pm 5\%$	W
R814	ERD75TAJ825	carbon	8.2M Ω	$\pm 5\%$	W
R815	ERQ12HJ5R6P	fusible	5.6 Ω	$\pm 5\%$	W
R816	ERDS2TJ222	carbon	2k2 Ω	$\pm 5\%$	W
R817	TRDS1VJ473	carbon	47k Ω	$\pm 5\%$	W
R818	ERD25TJ154	carbon	150k Ω	$\pm 5\%$	W
R820	ERDS1TJ393	carbon	39k Ω	$\pm 5\%$	W
R821	ERDS1TJ393	carbon	39k Ω	$\pm 5\%$	W
R822	TRDS1VJ473	carbon	47k Ω	$\pm 5\%$	W
R851	ERQ12HJ1R2P	fusible	1.2 Ω	$\pm 5\%$	W
R852	ERQ2CKPR47S	fusible	0.47 Ω	$\pm 5\%$	W
R854	ERQ2CKPR33S	fusible	0.33 Ω	$\pm 5\%$	W
R855	ERQ1CJP180S	fusible	18 Ω	$\pm 5\%$	W
R1101	ERDS2TJ102	carbon	1k Ω	$\pm 5\%$	W
R1102	ERDS2TJ100	carbon	10 Ω	$\pm 5\%$	W
R1103	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R1104	ERDS2TJ101	carbon	100 Ω	$\pm 5\%$	W
R1105	ERDS2TJ223	carbon	22k Ω	$\pm 5\%$	W
R1201	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R1202	ERDS2TJ101	carbon	100 Ω	$\pm 5\%$	W
R1203	ERDS2TJ101	carbon	100 Ω	$\pm 5\%$	W
R1205	ERDS2TJ472	carbon	4k7 Ω	$\pm 5\%$	W
R1207	ERDS2TJ331	carbon	330 Ω	$\pm 5\%$	W
R1207	ERDS2TJ101	carbon	100 Ω	$\pm 5\%$	W
R1208	ERDS2TJ100	carbon	10 Ω	$\pm 5\%$	W
R1210	ERDS2TJ471	carbon	470 Ω	$\pm 5\%$	W
R1212	ERDS2TJ271	carbon	270 Ω	$\pm 5\%$	W
R1213	ERDS2TJ271	carbon	270 Ω	$\pm 5\%$	W
R1214	ERDS2TJ271	carbon	270 Ω	$\pm 5\%$	W
R1215	ERG2ANJ680H	metal oxide	68 Ω	$\pm 5\%$	W
R1216	ERDS2TJ271	carbon	270 Ω	$\pm 5\%$	W
R1217	ERDS2TJ271	carbon	270 Ω	$\pm 5\%$	W
R1218	ERDS2TJ271	carbon	270 Ω	$\pm 5\%$	W
R1219	ERDS2TJ101	carbon	100 Ω	$\pm 5\%$	W
R1220	ERDS2TJ101	carbon	100 Ω	$\pm 5\%$	W
R1221	ERDS2TJ221	carbon	220 Ω	$\pm 5\%$	W
R1227	ERDS2TJ182	carbon	1k8 Ω	$\pm 5\%$	W
R1228	ERDS2TJ182	carbon	1k8 Ω	$\pm 5\%$	W
R1229	ERDS2TJ271	carbon	270 Ω	$\pm 5\%$	W
R1230	ERDS2TJ105	carbon	1M Ω	$\pm 5\%$	W
R1232	ERDS2TJ472	carbon	4k7 Ω	$\pm 5\%$	W
R1237	ERDS2TJ221	carbon	220 Ω	$\pm 5\%$	W
R1261	ERDS2TJ100	carbon	10 Ω	$\pm 5\%$	W
R1262	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R1263	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R1264	ERDS2TJ472	carbon	4k7 Ω	$\pm 5\%$	W
R1265	ERDS2TJ472	carbon	4k7 Ω	$\pm 5\%$	W
R1266	ERDS2TJ472	carbon	4k7 Ω	$\pm 5\%$	W
R1267	ERDS2TJ472	carbon	4k7 Ω	$\pm 5\%$	W
R1271	ERDS2TJ473	carbon	47k Ω	$\pm 5\%$	W
R1272	ERDS2TJ271	carbon	270 Ω	$\pm 5\%$	W
R1276	ERDS2TJ221	carbon	220 Ω	$\pm 5\%$	W
R1283	TSF19631	fuse			
R1343	ERDS2TJ331	carbon	330 Ω	$\pm 5\%$	W
R1344	ERDS2TJ473	carbon	47k Ω	$\pm 5\%$	W
R1355	ERDS2TJ473	carbon	47k Ω	$\pm 5\%$	W
R1356	ERDS2TJ473	carbon	47k Ω	$\pm 5\%$	W
R1357	ERDS2TJ472	carbon	47k Ω	$\pm 5\%$	W
R2101	ERDS2TJ102	carbon	1k Ω	$\pm 5\%$	W
R2102	ERDS2TJ153	carbon	15k Ω	$\pm 5\%$	W
R2103	ERDS2TJ824	carbon	820k Ω	$\pm 5\%$	W
R2104	ERDS2TJ183	carbon	18k Ω	$\pm 5\%$	W
R2105	ERDS2TJ561	carbon	560 Ω	$\pm 5\%$	W
R2106	ERDS2TJ184	carbon	180k Ω	$\pm 5\%$	W
R2111	ERDS2TJ470	carbon	47 Ω	$\pm 5\%$	W
R2112	ERQ14AJ220P	fusible	22 Ω	$\pm 5\%$	W
R2113	ERDS2TJ470	carbon	47 Ω	$\pm 5\%$	W
R2115	ERDS2TJ332	carbon	3k3 Ω	$\pm 5\%$	W
R2116	ERDS2TJ471	carbon	470 Ω	$\pm 5\%$	W
R2117	ERDS2TJ102	carbon	1k Ω	$\pm 5\%$	W

Ref No.	Part No.	Description	Value	Tolerance	Unit
R2134	ERDS2TJ471	carbon	470 Ω	$\pm 5\%$	W
R2138	ERDS2TJ102	carbon	1k Ω	$\pm 5\%$	W
R2201	ERDS2TJ474	carbon	470k Ω	$\pm 5\%$	W
R2202	ERDS2TJ182	carbon	1k8 Ω	$\pm 5\%$	W
R2203	ERDS2TJ104	carbon	100k Ω	$\pm 5\%$	W
R2204	ERDS2TJ273	carbon	27k Ω	$\pm 5\%$	W
R2205	ERDS2TJ102	carbon	1k Ω	$\pm 5\%$	W
R2206	ERDS2TJ562	carbon	5k6 Ω	$\pm 5\%$	W
R2207	ERD25TJ563	carbon	56k Ω	$\pm 5\%$	W
R2208	ERDS2TJ224	carbon	220k Ω	$\pm 5\%$	W
R2209	EVN64AA00B52	control	500 Ω B		
R2210	EVN64AA00B32	control	300 Ω B		
R2211	ERDS2TJ473	carbon	47k Ω	$\pm 5\%$	W
R2212	ERDS2TJ393	carbon	39k Ω	$\pm 5\%$	W
R2213	ERDS2TJ224	carbon	220k Ω	$\pm 5\%$	W
R2214	ERDS2TJ153	carbon	15k Ω	$\pm 5\%$	W
R2215	ERDS2TJ824	carbon	820k Ω	$\pm 5\%$	W
R2216	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R2217	ERDS2TJ102	carbon	1k Ω	$\pm 5\%$	W
R2224	EVN64AA00B54	control	50k Ω B		
R2225	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R2226	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R2227	ERDS2TJ223	carbon	22k Ω	$\pm 5\%$	W
R2228	ERDS2TJ471	carbon	470 Ω	$\pm 5\%$	W
R2229	ERDS2TJ821	carbon	820 Ω	$\pm 5\%$	W
R2230	ERDS2TJ393	carbon	39k Ω	$\pm 5\%$	W
R2231	ERDS2TJ392	carbon	3k9 Ω	$\pm 5\%$	W
R2232	ERD25TJ101	carbon	100 Ω	$\pm 5\%$	W
R2233	ERD25TJ101	carbon	100 Ω	$\pm 5\%$	W
R2234	ERDS2TJ392	carbon	3k9 Ω	$\pm 5\%$	W
R2236	ERD25TJ471	carbon	470 Ω	$\pm 5\%$	W
R2237	ERD25TJ331	carbon	330 Ω	$\pm 5\%$	W
R2238	ERD25TJ331	carbon	330 Ω	$\pm 5\%$	W
R2240	ERQ14AJ220P	fusible	22 Ω	$\pm 5\%$	W
R2351	ERDS2TJ102	carbon	1k Ω	$\pm 5\%$	W
R2352	ERDS2TJ102	carbon	1k Ω	$\pm 5\%$	W
R2353	ERDS2TJ331	carbon	330 Ω	$\pm 5\%$	W
R2354	ERDS2TJ331	carbon	330 Ω	$\pm 5\%$	W
R2355	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R2356	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R2357	ERDS2TJ104	carbon	100k Ω	$\pm 5\%$	W
R2358	ERDS2TJ104	carbon	100k Ω	$\pm 5\%$	W
R2359	ERQ14AJ4R7P	fusible	4.7 Ω	$\pm 5\%$	W
R2360	ERQ14AJ4R7P	fusible	4.7 Ω	$\pm 5\%$	W
R2361	ERDS2TJ274	carbon	270k Ω	$\pm 5\%$	W
R2362	ERDS2TJ104	carbon	100k Ω	$\pm 5\%$	W
R2363	ERQ14AJ101P	fusible	100 Ω	$\pm 5\%$	W
R2364	ERDS2TJ562	carbon	5k6 Ω	$\pm 5\%$	W
R2365	ERDS2TJ562	carbon	5k6 Ω	$\pm 5\%$	W
R2366	ERF10ZK4R7	wirewound	4.7 Ω	$\pm 10\%$	W
R2367	ERDS2TJ472	carbon	47k Ω	$\pm 5\%$	W
R2368	ERDS2TJ471	carbon	470 Ω	$\pm 5\%$	W
R2369	ERDS2TJ472	carbon	47k Ω	$\pm 5\%$	W
R2370	ERDS2TJ471	carbon	470 Ω	$\pm 5\%$	W
R2604	ERDS2TJ221	carbon	220 Ω	$\pm 5\%$	W
R2605	ERDS2TJ104	carbon	100k Ω	$\pm 5\%$	W
R2606	ERDS2TJ221	carbon	220 Ω	$\pm 5\%$	W
R2607	ERDS2TJ180	carbon	18 Ω	$\pm 5\%$	W
R2608	ERDS2TJ560	carbon	56 Ω	$\pm 5\%$	W
R2609	ERDS2TJ180	carbon	18 Ω	$\pm 5\%$	W
R2610	ERDS2TJ560	carbon	56 Ω	$\pm 5\%$	W
R2611	ERDS2TJ180	carbon	18 Ω	$\pm 5\%$	W
R2612	ERDS2TJ560	carbon	56 Ω	$\pm 5\%$	W
R2613	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R2614	ERDS2TJ750	carbon	75 Ω	$\pm 5\%$	W
R2616	ERDS2TJ473	carbon	47k Ω	$\pm 5\%$	W
R2619	ERDS2TJ473	carbon	47k Ω	$\pm 5\%$	W
R2620	ERDS2TJ101	carbon	100 Ω	$\pm 5\%$	W
R2621	ERDS2TJ750	carbon	75 Ω	$\pm 5\%$	W
R2623	ERDS2TJ681	carbon	680 Ω	$\pm 5\%$	W
R2625	ERDS2TJ102	carbon	1k Ω	$\pm 5\%$	W
R2627	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R2628	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R2629	ERDS2TJ101	carbon	100 Ω	$\pm 5\%$	W
R2630	ERDS2TJ222	carbon	2k2 Ω	$\pm 5\%$	W
R2631	ERDS2TJ101	carbon	100 Ω	$\pm 5\%$	W
R2632	ERDS2TJ680	carbon	68 Ω	$\pm 5\%$	W
R2633	ERDS2TJ103	carbon	10k Ω	$\pm 5\%$	W
R2634	ERQ12HJ8R2P	fusible	8.2 Ω	$\pm 5\%$	W
R2704	ERDS2TJ471	carbon	470 Ω	$\pm 5\%$	W

Ref No.	Part No.	Description	Value	Unit	W
R2705	ERDS2TJ471	carbon	470 Ω	\pm 5%	W
R2706	ERDS2TJ562	carbon	5k6 Ω	\pm 5%	W
R2707	ERDS2TJ472	carbon	4k7 Ω	\pm 5%	W
R2708	ERDS2TJ104	carbon	100k Ω	\pm 5%	W
R2709	ERDS2TJ151	carbon	150 Ω	\pm 5%	W
R2710	EVN64AA00B23	control	2k Ω B		
R2711	ERDS2TJ562	carbon	5k6 Ω	\pm 5%	W
R2712	ERDS2TJ393	carbon	39k Ω	\pm 5%	W
R2713	ERDS2TJ222	carbon	2k2 Ω	\pm 5%	W
R2714	ERDS2TJ104	carbon	100k Ω	\pm 5%	W
R2715	ERDS2TJ822	carbon	8k2 Ω	\pm 5%	W
R2716	ERDS2TJ332	carbon	3k3 Ω	\pm 5%	W
R2717	ERDS2TJ393	carbon	39k Ω	\pm 5%	W
R2718	ERDS2TJ562	carbon	5k6 Ω	\pm 5%	W
R3501	ERDS2TJ221	carbon	220 Ω	\pm 5%	W
R3502	ERDS2TJ392	carbon	3k9 Ω	\pm 5%	W
R3503	ERDS2TJ471	carbon	470 Ω	\pm 5%	W
R3504	ERDS2TJ822	carbon	8k2 Ω	\pm 5%	W
R3505	ERDS2TJ102	carbon	1k Ω	\pm 5%	W
R3506	ERDS2TJ122	carbon	1k2 Ω	\pm 5%	W
R3507	ERDS2TJ102	carbon	1k Ω	\pm 5%	W
R3508	ERDS2TJ122	carbon	1k2 Ω	\pm 5%	W
R3509	ERDS2TJ122	carbon	1k2 Ω	\pm 5%	W
R3510	ERDS2TJ102	carbon	1k Ω	\pm 5%	W
R3511	ERDS2TJ102	carbon	1k Ω	\pm 5%	W
R3512	ERDS2TJ103	carbon	10k Ω	\pm 5%	W
R3513	ERDS2TJ223	carbon	22k Ω	\pm 5%	W
R3514	EVN64AA00B24	control	20k Ω B		
R3515	ERDS2TJ392	carbon	3k9 Ω	\pm 5%	W
R3516	ERDS2TJ153	carbon	15k Ω	\pm 5%	W
R3517	ERDS2TJ220	carbon	22 Ω	\pm 5%	W
R3518	ERDS2TJ220	carbon	22 Ω	\pm 5%	W
R3519	ERDS2TJ103	carbon	10k Ω	\pm 5%	W
R3520	ERDS2TJ821	carbon	820 Ω	\pm 5%	W
R3522	ERDS2TJ332	carbon	3k3 Ω	\pm 5%	W
R3523	ERDS2TJ471	carbon	470 Ω	\pm 5%	W
R3524	ERDS2TJ683	carbon	68k Ω	\pm 5%	W
R3525	ERDS2TJ331	carbon	330 Ω	\pm 5%	W
R3526	ERDS1FJ1R0	carbon	1 Ω	\pm 5%	W
R3532	ERDS2TJ332	carbon	3k3 Ω	\pm 5%	W
R3533	ERDS2TJ331	carbon	330 Ω	\pm 5%	W
R3534	ERDS2TJ750	carbon	75 Ω	\pm 5%	W
R3535	ERDS2TJ750	carbon	75 Ω	\pm 5%	W
R3536	ERDS2TJ750	carbon	75 Ω	\pm 5%	W
R3541	ERDS2TJ101	carbon	100 Ω	\pm 5%	W
R3542	ERDS2TJ101	carbon	100 Ω	\pm 5%	W
R3552	ERDS2TJ101	carbon	100 Ω	\pm 5%	W
R3558	ERDS2TJ471	carbon	470 Ω	\pm 5%	W
R3559	ERDS2TJ102	carbon	1k Ω	\pm 5%	W
R3560	ERDS2TJ561	carbon	560 Ω	\pm 5%	W
R3561	ERDS2TJ392	carbon	3k9 Ω	\pm 5%	W
R3562	ERDS2TJ122	carbon	1k2 Ω	\pm 5%	W
R3563	ERDS2TJ753	carbon	75k Ω	\pm 5%	W
R3564	ERDS2TJ472	carbon	4k7 Ω	\pm 5%	W
R3565	ERDS2TJ103	carbon	10k Ω	\pm 5%	W
R3566	ERDS2TJ823	carbon	82k Ω	\pm 5%	W
R3567	ERDS2TJ472	carbon	4k7 Ω	\pm 5%	W
R3568	ERDS2TJ822	carbon	8k2 Ω	\pm 5%	W
R3573	ERDS2TJ103	carbon	10k Ω	\pm 5%	W
R3574	ERDS2TJ102	carbon	1k Ω	\pm 5%	W
R3575	ERDS2TJ472	carbon	4k7 Ω	\pm 5%	W
R3580	ERDS2TJ332	carbon	3k3 Ω	\pm 5%	W
R3582	ERDS2TJ103	carbon	10k Ω	\pm 5%	W
R3587	ERQ14AJ4R7P	fusible	4.7 Ω	\pm 5%	W

CAPACITORS

C11	ECEA50Z1B	electrolytic	1 μ F	50v
C12	ECEA1CU100B	electrolytic	10 μ F	16v
C13	ECKR1H103ZF5	ceramic	10 nF	50v
C14	ECEA1CU330B	electrolytic	33 μ F	16v
C15	ECEA50ZR22B	electrolytic	0.22 μ F	50v
C20	ECCR1H470J5	ceramic	47 pF	50v
C22	ECKR1H102KB5	ceramic	1 nF	50v
C23	ECKR1H103ZF5	ceramic	10 nF	50v
C24	ECEA1CU330B	electrolytic	33 μ F	16v
C26	ECEA1HU010B	electrolytic	1 μ F	50v
C27	ECKR1H103ZF5	ceramic	10 nF	50v
C31	ECKR1H103ZF5	ceramic	10 nF	50v
C70	ECEA1HU010B	electrolytic	1 μ F	50v
C71	ECEA1HU00B	electrolytic	10 μ F	50v
C101	ECKR1H103ZF5	ceramic	10 nF	50v
C102	ECKR1H103ZF5	ceramic	10 nF	50v

Ref No.	Part No.	Description	Value	Unit	W
C105	ECCR1H121J5	ceramic	120 pF	50v	
C106	ECCR1H560J5	ceramic	56 pF	50v	
C107	ECQMIH223KV3	plastic film	22 nF	50v	
C108	ECEA1CU102E	electrolytic	1000 μ F	16v	
C109	ECKR1H103ZF5	ceramic	10 nF	50v	
C115	ECEA1CU101B	electrolytic	100 μ F	16v	
C116	ECKR1H103ZF5	ceramic	10 nF	50v	
C118	ECEA50ZR33B	electrolytic	0.33 μ F	50v	
C122	ECCR1H21J5	ceramic	120 pF	50v	
C123	ECKR1H103ZF5	ceramic	10 nF	50v	
C124	ECCR1H270J5	ceramic	27 pF	50v	
C125	ECKR1H103ZF5	ceramic	10 nF	50v	
C171	ECQMIH473KV3	plastic film	47 nF	50v	
C172	ECCR1H330J5	ceramic	33 pF	50v	
C175	ECQV1H105JZW	plastic film	1 μ F	50v	
C176	ECKR1H103ZF5	ceramic	10 nF	50v	
C177	ECEA1AU220B	electrolytic	22 μ F	10v	
C179	ECQV1H474JZ3	plastic film	470 nF	50v	
C184	ECEA1HU010B	electrolytic	1 μ F	50v	
C205	ECKR1H103ZF5	ceramic	10 nF	50v	
C209	ECEA1CU100B	electrolytic	10 μ F	16v	
C210	ECEA50ZR22B	electrolytic	0.22 μ F	50v	
C211	ECEA1CU220B	electrolytic	22 μ F	16v	
C212	ECKR1H103ZF5	ceramic	10 nF	50v	
C213	ECKR1H103ZF5	ceramic	10 nF	50v	
C214	ECEA1CU100B	electrolytic	10 μ F	16v	
C216	ECEA50ZR22B	electrolytic	0.22 μ F	50v	
C218	ECEA1CU101B	electrolytic	100 μ F	16v	
C219	ECEA1CU100B	electrolytic	10 μ F	16v	
C301	ECEA1CU471E	electrolytic	470 pF	16v	
C302	ECKW1H103ZF5	ceramic	10 nF	50v	
C303	ECEA1CN220SB	electrolytic	22 μ F	16v	
C307	ECCR1H221J5	ceramic	220 pF	50v	
C308	ECKR1H103ZF5	ceramic	10 nF	50v	
C309	ECEA1HU100B	electrolytic	10 μ F	50v	
C311	ECEA1HUR47B	electrolytic	0.47 μ F	50v	
C312	ECQV1H104JZ3	plastic film	100 nF	50v	
C313	ECQV1H104JZ3	plastic film	100 nF	50v	
C314	ECQV1H104JZ3	plastic film	100 nF	50v	
C317	ECEA1EU4R7B	electrolytic	4.7 μ F	25v	
C323	ECCR1H470J5	ceramic	47 pF	50v	
C351	ECCR1H221K5	ceramic	220 pF	50v	
C352	ECCR1H271K5	ceramic	270 pF	50v	
C353	ECCR1H221K5	ceramic	220 pF	50v	
C355	ECKW3D152KBN	ceramic	1.5 nF	2kv	
C357	ECKR2H152KB2	ceramic	1.5 nF	500v	
C358	ECEA1HU220B	electrolytic	22 μ F	50v	
C368	ECEA2ES010E	electrolytic	1 μ F	250v	
C401	ECQMIH472KV3	plastic film	4.7 nF	50v	
C402	ECQV1H224JZ3	plastic film	220 nF	50v	
C409	ECQMIH272KV3	plastic film	2.7 nF	50v	
C452	ECKR2H471KB2	ceramic	470 pF	500v	
C453	ECKR1H103ZF5	ceramic	10 μ F	50v	
C455	ECEA1VU010B	electrolytic	100 μ F	35v	
C456	ECEA1VU222E	electrolytic	2200 μ F	35v	
C457	ECEA25Z10B	electrolytic	10 μ F	25v	
C458	ECEA1VU332E	electrolytic	3300 μ F	35v	
C459	ECQV1H104JZ3	plastic film	100 nF	50v	
C464	ECKR1H103ZF5	ceramic	10 μ F	50v	
C501	ECEA50ZR47B	electrolytic	0.47 μ F	50v	
C502	ECQK1272GZ3	plastic film	2.7 nF	100v	
C503	ECQMIH223JV3	plastic film	22 nF	50v	
C504	ECCR1H560JC	ceramic	56 pF	50v	
C505	ECQV1H154JZ3	plastic film	150 nF	50v	
C506	ECEA1CN220SB	electrolytic	22 μ F	16v	
C507	ECQV1H474JZ3	plastic film	470 nF	50v	
C510	ECKR1H152KB5	ceramic	1.5 nF	50v	
C511	ECEA1CU220B	electrolytic	22 μ F	16v	
C523	ECEA1HN010SB	electrolytic	1 μ F	50v	
C531	ECE01103KNB	plastic film	10 nF	100v	
C541	ECEA1HU2R2B	electrolytic	2.2 μ F	50v	
C542	ECEA1JU100B	electrolytic	10 μ F	63v	
C543	ECEA1CU100B	electrolytic	10 μ F	16v	
C551	ECEA2VS010E	electrolytic	1 μ F	350v	
C552	ECWF2H824JZB	plastic film	390 nF	500v	
C554	ECEA2ES100E	electrolytic	10 μ F	250v	
C555	ECKR2H471KB2	ceramic	470 pF	500v	
C556	ECKD3F122JB	ceramic	1.2 μ F	3kv	
C558	ECWH1H2822JS	plastic film	390 nF	500v	
C560	ECWF2H334JZB	plastic film	330 nF	500v	
C561	ECKD3D561JBN	ceramic	560 pF	2kv	
C566	ECKR2H471KB2	ceramic	470 pF	500v	

Ref No.	Part No.	Description		
C576	ECEA1CU471E	electrolytic	470 μ F	16v
C603	ECKR1H103ZF5	ceramic	10 nF	50v
C604	ECEA50ZR33B	electrolytic	0.33 μ F	50v
C607	ECEA1HU010B	electrolytic	1 μ F	50v
C608	ECQV1H474JZ3	plastic film	470 nF	50v
C609	ECQV1H474JZ3	plastic film	470 nF	50v
C610	TCRHA030E11	trimmer capacitor	30 pF	
C611	ECCR1H101JC	ceramic	100 pF	50v
C613	ECKR1H103ZF5	ceramic	10 nF	50v
C615	ECEA1VU4R7B	electrolytic	4.7 μ F	35v
C617	ECEA1HN2R2SB	electrolytic	2.2 μ F	50v
C622	ECQV1H334JZ3	plastic film	330 nF	50v
C623	ECQV1H334JZ3	plastic film	330 nF	50v
C624	ECQV1H334JZ3	plastic film	330 nF	50v
C626	ECKR1H103ZF5	ceramic	10 nF	50v
C751	ECQV1H104JZ3	plastic film	100 nF	50v
C752	ECQV1H104JZ3	plastic film	100 nF	50v
C753	ECQE10223KVB	plastic film	22 nF	1kv
C754	ECCR1H181J5	ceramic	180 pF	50v
C755	ECEA1VU470B	electrolytic	47 μ F	35v
C756	ECEA1EU221B	electrolytic	220 μ F	25v
C758	ECQE1225KNB	plastic film	2.2 μ F	100v
C803	ECKW2H472PU8	ceramic	4.7 nF	500v
C804	ECKW2H472PU8	ceramic	4.7 nF	500v
C805	ECKW2H472PU8	ceramic	4.7 nF	500v
C806	ECKW2H472PU8	ceramic	4.7 nF	500v
C807	ECES2GU221N	electrolytic	220 μ F	400v
C808	ECEA50Z10B	electrolytic	10 μ F	50v
C809	ECQV1H154JZ3	plastic film	150 nF	50v
C810	ECKW2H103PU8	ceramic	10 nF	500v
C811	ECKD3A821KBN	ceramic	820 pF	1kv
C812	ECKD3A471KBN	ceramic	470 pF	1kv
C815	ECKR2H471KB2	ceramic	470 pF	500v
C816	ECQE6473KZB	plastic film	47 nF	630v
C817	ECKR1H471KB5	ceramic	470 pF	50v
C820	ECKD3A102KBN	ceramic	1 nF	1kv
C821	ECKD2H471KB2	ceramic	470 pF	500v
C851	ECKD3A152KBN	ceramic	1.5 nF	1kv
C852	ECKR2H681K2	ceramic	680 pF	500v
C853	ECKR2H561K2B	ceramic	560 pF	500v
C854	ECEA2ES101E	electrolytic	100 μ F	250v
C855	ECEA1VU101B	electrolytic	100 μ F	35v
C856	ECEA1VU471E	electrolytic	470 μ F	35v
C857	ECKR2H471KB2	ceramic	470 pF	500v
C858	ECEA1EU102E	electrolytic	1000 μ F	25v
C859	ECEA1EU100B	electrolytic	10 μ F	25v
C860	ECKR1H103ZF5	ceramic	10 nF	50v
C861	ECEA1CU101B	electrolytic	100 μ F	16v
C1101	ECEA1CU100B	electrolytic	10 μ F	16v
C1102	ECEA1CU100B	electrolytic	10 μ F	16v
C1103	ECEA1CU100B	electrolytic	10 μ F	16v
C1104	ECQMIH392KV3	plastic film	3.9 nF	50v
C1105	ECQMIH333JV3	plastic film	33 nF	50v
C1106	ECOP1392GZB	plastic film	3.9 nF	1.3kv
C1107	ECEA0JU101B	electrolytic	100 μ F	6.3v
C1201	ECKR1H103ZF5	ceramic	10 nF	50v
C1202	ECQMIH272KV3	plastic film	2.7 nF	50v
C1203	ECEA0JU101B	electrolytic	100 μ F	6.3v
C1205	ECQV1H104JZ3	plastic film	100 nF	50v
C1206	ECEA1CU102E	electrolytic	1000 μ F	16v
C1207	ECCR1H270K5	ceramic	27 pF	50v
C1208	ECCR1H270K5	ceramic	27 pF	50v
C1211	ECKR1H103ZF5	ceramic	10 nF	50v
C1213	ECKR1H103ZF5	ceramic	10 nF	50v
C1214	ECEA0JU221B	electrolytic	220 μ F	6.3v
C1220	ECEA0JU102E	electrolytic	1000 μ F	6.3v
C1221	ECKR1H103ZF5	ceramic	10 nF	50v
C1222	ECEA50Z1B	electrolytic	1 μ F	50v
C1227	ECQV1H104JZ3	plastic film	100 nF	50v
C2101	ECCR1H101JC	ceramic	100 pF	50v
C2102	ECCR1H030CC	ceramic	3 pF	50v
C2103	ECKR1H103ZF5	ceramic	10 nF	50v
C2104	ECQMIH472KV3	plastic film	4.7 nF	50v
C2105	ECQMIH472KV3	plastic film	4.7 nF	50v
C2108	ECEA50ZR47B	electrolytic	0.47 μ F	50v
C2109	ECQMIH103KV3	plastic film	10 nF	50v
C2110	ECEA1HU010B	electrolytic	1 μ F	50v
C2111	ECQMIH103KV3	plastic film	10 nF	50v
C2112	ECEA1CU330B	electrolytic	33 μ F	16v
C2113	ECKR1H103ZF5	ceramic	10 nF	50v
C2114	ECEA1HUR47B	electrolytic	0.47 μ F	50v
C2115	ECCR1H150JP	ceramic	15 pF	50v

Ref No.	Part No.	Description		
C2116	ECEA1CU100B	electrolytic	10 μ F	16v
C2120	ECQMIH103KV3	plastic film	10 nF	50v
C2121	ECCR1H470JC	ceramic	47 pF	50v
C2122	ECQMIH103KV3	plastic film	10 nF	50v
C2124	ECQMIH473KV3	plastic film	47 nF	50v
C2127	ECCR1H470JC	ceramic	47 pF	50v
C2131	ECCR1H070CC	ceramic	7 pF	50v
C2132	ECCR1H100DC	ceramic	10 pF	50v
C2201	ECQMIH102KV3	plastic film	1 nF	50v
C2202	ECQMIH822KV3	plastic film	8.2 nF	50v
C2203	ECQMIH273KV3	plastic film	27 nF	50v
C2204	ECQMIH102KV3	plastic film	1 nF	50v
C2205	ECEA1CU100B	electrolytic	10 μ F	16v
C2206	ECEA50ZR47B	electrolytic	0.47 μ F	50v
C2207	ECQV1H224JZ3	plastic film	220 nF	50v
C2208	ECQV1H104JZ3	plastic film	100 nF	50v
C2209	ECQV1H224JZ3	plastic film	220 nF	50v
C2210	ECQV1H224JZ3	plastic film	220 nF	50v
C2211	ECQV1H104JZ3	plastic film	100 nF	50v
C2213	ECEA1CU101B	electrolytic	100 μ F	16v
C2216	ECEA1HN4R7SB	electrolytic	4.7 μ F	50v
C2217	ECEA1HN4R7SB	electrolytic	4.7 μ F	50v
C2218	ECQMIH473KV3	plastic film	47 nF	50v
C2220	ECQV1H474JZ3	plastic film	470 nF	50v
C2221	TCQP1562JZ3	plastic film	5.6 nF	100v
C2222	ECQMIH223KV3	plastic film	22 nF	50v
C2223	ECEA1CU101B	electrolytic	100 μ F	16v
C2224	ECCR1H102JC	ceramic	12 pF	50v
C2225	ECQMIH102KV3	plastic film	1 nF	50v
C2226	ECQMIH103KV3	plastic film	10 nF	50v
C2351	ECQMIH183KV3	plastic film	18 nF	50v
C2352	ECQMIH183KV3	plastic film	18 nF	50v
C2353	ECEA1HNR47SB	electrolytic	0.47 μ F	50v
C2354	ECEA1HNR47SB	electrolytic	0.47 μ F	50v
C2355	ECEA1EU221B	electrolytic	220 μ F	25v
C2356	ECEA1EU221B	electrolytic	220 μ F	25v
C2357	ECEA1VU470B	electrolytic	47 μ F	35v
C2358	ECEA1VU470B	electrolytic	47 μ F	35v
C2359	ECQV1H104JZ3	plastic film	100 nF	50v
C2360	ECQV1H104JZ3	plastic film	100 nF	50v
C2361	ECEA1HU102E	electrolytic	1000 μ F	50v
C2362	ECEA1HU102E	electrolytic	1000 μ F	50v
C2363	ECEA1HU101B	electrolytic	1 μ F	50v
C2364	ECEA1VU470B	electrolytic	47 μ F	35v
C2365	ECEA1HU101B	electrolytic	100 μ F	50v
C2366	ECQMIH823KV3	plastic film	82 nF	50v
C2367	ECQMIH823KV3	plastic film	82 nF	50v
C2368	ECEA1HU472H	electrolytic	4700 μ F	50v
C2369	ECEA1HU102E	electrolytic	1000 μ F	50v
C2370	ECQMIH273KV3	plastic film	27 nF	50v
C2371	ECQMIH273KV3	plastic film	27 nF	50v
C2401	ECEA1CU471E	electrolytic	470 μ F	16v
C2402	ECQV1H104JZ3	plastic film	100 nF	50v
C2403	ECKR1H103ZF5	ceramic	10 nF	50v
C2404	ECEA1EU330B	electrolytic	33 μ F	25v
C2601	ECKR1H103ZF5	ceramic	10 nF	50v
C2602	ECEA1EN4R7SB	electrolytic	4.7 μ F	25v
C2603	ECEA1CN100SB	electrolytic	10 μ F	16v
C2604	ECEA1HN010SB	electrolytic	1 μ F	50v
C2605	ECEA1HN010SB	electrolytic	1 μ F	50v
C2606	ECEA1CU471E	electrolytic	470 μ F	16v
C2607	ECEA1CU100B	electrolytic	10 μ F	16v
C2608	ECQV1H104JZ3	plastic film	100 nF	50v
C2609	ECEA1EN4R7SB	electrolytic	4.7 μ F	25v
C2610	ECEA1HU101B	electrolytic	1 μ F	50v
C2611	ECEA1HU010B	electrolytic	1 μ F	50v
C2612	ECEA1CN100SB	electrolytic	10 μ F	16v
C2613	ECEA1CU471E	electrolytic	470 μ F	16v
C2701	ECEA1CU330B	electrolytic	33 μ F	16v
C2702	ECQMIH103KV3	plastic film	10 nF	50v
C2703	ECQMIH392KV3	plastic film	3.9 nF	50v
C2704	ECEA1CU331B	electrolytic	330 μ F	16v
C2705	ECEA1HU010B	electrolytic	1 μ F	50v
C2706	TCQP1562JZ3	plastic film	5.6 nF	100v
C2707	ECQMIH272KV3	plastic film	2.7 nF	50v
C2708	ECEA1HU3R3B	electrolytic	3.3 μ F	50v
C2734	ECEA1CU100B	electrolytic	10 μ F	16v
C2735	ECEA1CU100B	electrolytic	10 μ F	16v
C2736	ECQMIH103KV3	plastic film	10 nF	50v
C3502	ECCR1H150J5	ceramic	15 pF	50v
C3503	ECKR1H102KB5	ceramic	1 nF	50v
C3504	ECKR1H471KB5	ceramic	470 μ F	50v
C3505	ECQMIH223KV3	plastic film	22 nF	50v

Ref No.	Part No.	Description		
C3506	ECKR1H271K85	ceramic	270 pF	50v
C3507	ECCR1H101J5	ceramic	100 pF	50v
C3508	ECCR1H150JC	ceramic	15 pF	50v
C3509	ECCR1H270JP	ceramic	27 pF	50v
C3510	TCQM1H683KZ3	plastic film	68 nF	50v
C3511	ECCR1H221J5	ceramic	220 pF	50v
C3512	ECQM1H473KV3	plastic film	47 nF	50v
C3513	ECEA1CU100B	electrolytic	10 μ F	16v
C3515	ECQM1H473KV3	plastic film	47 nF	50v
C3516	ECQV1H224JZ3	plastic film	220 nF	50v
C3517	ECKR1H103ZF5	ceramic	10 nF	50v
C3518	ECEA1HU2R2B	electrolytic	2.2 μ F	50v
C3519	ECQV1H104JZ3	plastic film	100 nF	50v
C3520	ECEA1CU101B	electrolytic	100 μ F	16v
C3521	ECQV1H104JZ3	plastic film	100 nF	50v
C3522	ECEA1HU2R2B	electrolytic	2.2 μ F	50v
C3523	ECEA0JU101B	electrolytic	100 μ F	6.3v
C3524	ECEA0JU222E	electrolytic	2200 μ F	6.3v
C3525	ECEA1CU470B	electrolytic	47 μ F	16v
C3526	ECKR1H103ZF5	ceramic	10 nF	50v
C3527	ECCR1H180J5	ceramic	18 pF	50v
C3528	TCRHA20E11	trimmer capacitor	20 pF	
C3532	ECKR1H103ZF5	ceramic	10 nF	50v
C3533	ECQM1H223KV3	plastic film	22 nF	50v
C3534	ECEA1CU220B	electrolytic	22 μ F	16v
C3535	ECKR1H103ZF5	ceramic	10 nF	50v
C3536	ECKR1H103ZF5	ceramic	10 nF	50v
C3550	ECEA1HN010SB	electrolytic	1 μ F	50v
C3552	ECKR1H103ZF5	ceramic	10 nF	50v
C3553	ECEA1CU221B	electrolytic	220 μ F	16v
C3554	ECCR1H100F5	ceramic	10 pF	50v
C3555	ECEA1CN330SB	electrolytic	33 μ F	16v
C3556	ECCR1H100FC	ceramic	10 pF	50v
C3557	ECCR1H330K5	ceramic	33 pF	50v
C3558	ECRBA160N1	trimmer capacitor	16 pF	
C3559	ECCR1H560J5	ceramic	56 pF	50v
C3560	ECEA1HU010B	electrolytic	1 μ F	50v
C3565	ECCR1H070DC	ceramic	7 pF	50v

COILS

LC601	TLK153162E	coil		
L12	TLT082L991R	coil		
L16	TLT082L991R	coil		
L17	TLT082L991R	coil		
L18	TLT082L991R	coil		
L22	TLT047L991R	coil		
L101	TLI151757	coil		
L102	TLI151757	coil		
L103	TLT100K166C	coil		
L104	TLS61353-1	coil		
L171	TLT082L991R	coil		
L301	TLT390K991R	coil		
L351	TLT181K991R	coil		
L352	TLT181K991R	coil		
L353	TLT181K991R	coil		
L451	TLT082L991R	coil		
L552	ELC07B013	coil		
L553	ELH5L403	coil		
L554	ELC15B004	coil		
L602	EIK1EG013B	coil		
L603	TLK158069	coil		
L604	TLT100K991R	coil		
L752	ELC10B008	coil		
L801	ELF18D650L	filter		
L802	ELF18D650L	filter		
L803	TSC925-4	bead choke		
L804	TSC925-4	bead choke		
L806	TSC925-4	bead choke		
L808	TLT101K991R	coil		
L852	TSC925-4	bead choke		
L853	TLT100K991R	coil		
L854	TLT220K991R	coil		
L1101	TLT542K991K	coil		
L1102	EIR7QG001B	coil		
L1201	TLT082L991R	coil		
L2101	TLI151777	coil		
L2104	TLS153255	coil		
L2108	TLI767950	coil		
L2109	TLT047L991R	coil		
L2201	TLS151351	coil		
L2202	TLT102K991R	coil		

Ref No.	Part No.	Description
L2203	TLS153254-1	coil
L3501	TLT150K991R	coil
L3502	TLT100K991R	coil
L3503	TLT047L991R	coil
L3504	TLT100K991R	coil

DIODES

D171	MA4082TA	diode
D174	MA165TA5	diode
D177	MA165TA5	diode
D179	MA4047HTA	diode
D201	MA165TA5	diode
D204	MA165TA5	diode
D205	MA165TA5	diode
D305	MA165TA5	diode
D306	MA165TA5	diode
D307	MA165TA5	diode
D309	MA165TA5	diode
D313	MA27TATA	diode
D314	MA4030HTA	diode
D315	MA165TA5	diode
D316	MA165TA5	diode
D317	MA165TA5	diode
D318	MA4091TA	diode
D319	MA165TA5	diode
D320	MA165TA5	diode
D321	MA165TA5	diode
D451	ERA15-02V3	diode
D452	MA165TA5	diode
D453	MA165TA5	diode
D504	MA165TA5	diode
D505	MA27TATA	diode
D506	MA4100TA	diode
D508	MA4056HTA	diode
D541	MA1360MTA	diode
D551	ERA22-02V3	diode
D552	MA167TA5	diode
D554	ERA22-02V3	diode
D753	TVSC2715	diode
D754	TVSRU2AM	diode
D755	MA4200MTA	diode
D801	D4S880Z	diode
D804	ERZC10DK621C	diode
D805	232266298009	diode
D807	ERA22-04V3	diode
D809	ERA22-02V3	diode
D810	ERA22-08V3	diode
D811	ON3105.TV	diode
D851	TVSC2408M	diode
D852	EU02V0	diode
D853	ERD32-02L7	diode
D854	TVSSR2KL	diode
D855	ERD32-02L7	diode
D1101	TVSPH302	diode
D1201	MA4082HTA	diode
D1202	MA4082HTA	diode
D1203	MA4082HTA	diode
D1208	TVSS1WBS10	diode
D1212	MA4082HTA	diode
D1219	MA4082TA	diode
D1220	MA165TA5	diode
D1221	MA4082TA	diode
D1251	LN81RPHL	L.E.D.
D1253	LN524GA-(L)	L.E.D.
D1255	LN033183P1	L.E.D.
D2202	MA165TA5	diode
D2203	MA154WA	diode
D2351	TVSRD12FB1V	diode
D2603	MA165TA5	diode
D2604	MA165TA5	diode
D2605	MA165TA5	diode
D2607	MA165TA5	diode
D2608	MA165TA5	diode
D2609	MA165TA5	diode
D3502	MA165TA5	diode
D3503	MA150TA5	diode
D3504	MA150TA5	diode
D3505	MA150TA5	diode
D3516	MA165TA5	diode
D3517	MA165TA5	diode
D3523	MA165TA5	diode
D3528	MA165TA5	diode
D3529	MA165TA5	diode
D3530	MA165TA5	diode

Ref No.	Part No.	Description
TRANSISTORS		
Q21	2SC2636	N.P.N. transistor
Q101	2SC1685TA	N.P.N. transistor
Q104	2SC2636	N.P.N. transistor
Q201	UN111	transistor
Q202	UN1211	transistor
Q303	2SC2636	N.P.N. transistor
Q304	2SC1685TA	N.P.N. transistor
Q305	2SC1685TA-S	N.P.N. transistor
Q306	2SA564ATA	P.N.P. transistor
Q351	2SC2923RL	N.P.N. transistor
Q352	2SC2923RL	N.P.N. transistor
Q353	2SC2923RL	N.P.N. transistor
Q501	2SD836ALB	N.P.N. transistor
Q502	2SC1685TA	N.P.N. transistor
Q503	UN1211	transistor
Q505	UN1211	transistor
Q541	2SA564ATA	P.N.P. transistor
Q542	2SC1685TA	N.P.N. transistor
Q551	2SD1441RL	N.P.N. transistor
Q751	2SC1685TA	N.P.N. transistor
Q752	2SB642-PQRS	P.N.P. transistor
Q753	2SD762LB	N.P.N. transistor
Q801	2SD965-R	N.P.N. transistor
Q802	2SD965-R	N.P.N. transistor
Q1201	2SC1685TA	N.P.N. transistor
Q1202	2SA564ATA	P.N.P. transistor
Q1203	2SA564ATA	P.N.P. transistor
Q1205	2SC1685TA	N.P.N. transistor
Q1206	2SA564ATA	P.N.P. transistor
Q1208	2SA564ATA	P.N.P. transistor
Q1218	2SA564ATA	P.N.P. transistor
Q2201	2SD637	N.P.N. transistor
Q2203	2SC1685TA	N.P.N. transistor
Q2204	UN1212	transistor
Q2205	2SC1685TA	N.P.N. transistor
Q2206	2SD637	N.P.N. transistor
Q2601	2SD637	N.P.N. transistor
Q2602	2SD637	N.P.N. transistor
Q2604	2SB642-PQRS	P.N.P. transistor
Q2605	2SD637	N.P.N. transistor

Ref No.	Part No.	Description
Q2606	UN121D	transistor
Q2607	UN1213	transistor
Q2608	UN1211	transistor
Q2702	2SC1685TA	N.P.N. transistor
Q3501	2SC1685TA	N.P.N. transistor
Q3502	2SC1685TA	N.P.N. transistor
Q3503	2SC1685TA	N.P.N. transistor
Q3504	2SC1685TA	N.P.N. transistor
Q3505	2SC1685TA	N.P.N. transistor
Q3506	2SC1685TA	N.P.N. transistor
Q3513	2SC1685TA	N.P.N. transistor
Q3514	2SA564ATA	P.N.P. transistor
Q3515	2SC1685TA	N.P.N. transistor
Q3516	2SA564ATA	P.N.P. transistor
Q3518	2SC1685TA	N.P.N. transistor
I.C's		
IC101	TDA4505M-N1	I.C.
IC1101	UPC1474HA	I.C.
IC1202	PCD8572P	memory I.C.
IC1203	MAB8441PT090	I.C.
IC1204	L78M05MRB	I.C.
IC171	SAB3035	I.C.
IC201	AN5836	I.C.
IC2102	AN5136K	I.C.
IC2202	TDA3803A	I.C.
IC2203	AN5215	audio I.C.
IC2351	STK4412	I.C.
IC2401	L78M12-M-RB	I.C.
IC2601	TVSM51320P	diode
IC2702	AN5421	I.C.
IC3501	SAA5231	I.C.
IC3502	SAA5240A	I.C.
IC3504	L78N12-M-RB	I.C.
IC3505	L78M05MRB	I.C.
IC3506	TVSM58725P	I.C.
IC451	TDA3654	I.C.
IC601	TDA3562A	I.C.
IC70	TVSUPC574J	I.C.
IC801	STR54041-M	I.C.
IC851	L78M12-M-RB	I.C.